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PHILOLOGY.—*English-language surnames of biological origin.*[1] PEREZ SIMMONS, Fresno, Calif. (Communicated by JOSEPH S. WADE.)

In the normal course of events every person born in the United States possesses immediately two permanent designations, his family name and his national citizenship. To most people these are perhaps equally precious, but the first is of course the more personal. Family names are treasured inheritances, and even those that may seem, to the other fellow, to be trivial, amusing, or absurd are likely to be continued for scores of generations. Surnames are our handholds on the family tree, and most of us refuse to let go.

The surnames of biological origin listed in this report I have found in telephone directories. Included are plant and animal names and terms referring to the parts of plants and animals (Daisy, Moose, Seed, Antler). Associations of plants and of animals (Orchard, Herd, Covey) are left out, as are also descriptive-anatomical names (Barefoot, Smallback) and physical abnormalities. Not too strictly, I have omitted varieties of domesticated plants and animals (Pippin, Beagle), some products made from and most constituents of plants and animals (Cream, Hay, Leather, Pickles, Pitch), and obsolete words (Poe and Coe for peacock and jackdaw). Most compounds such as those of big, bird, berry, corn, crow, gold, long, short, silver, small, wood, and the names of colors are left out (Birdseye, Greenleaf, Redapple). No attempt has been made to trace derivations. One advantage of making my own rules has been freedom to appropriate names of dual or multiple meanings.

Books and other references on the subject point out that in Biblical times, and until after the Norman Conquest in 1066, ordinary people had only one name, such as Joseph. As populations increased, the convenience of having another name was recognized, and surnames began to be adopted. That was some 700 years before Linnaeus established the binomial system for the science of biology.

In Great Britain the cities were ahead of the countryside in making the change. Whether the surnames established there were allotted to families or were chosen by them without official guidance is not on record in the sources that I have examined. It seems likely that both methods were used. From the wide coverage of the names that I shall list farther on, one would surmise that some system was involved, at one time or another.

Surnames have been grouped under four classifications: locality names derived from the home of the bearer (Kent); patronymics, those referring to the father's Christian name (Robertson); names taken from occupations (Weaver); and nicknames (Fox, House, Longfellow, Stone).

On the whole, the family names that I have found in my hunting through telephone directories have a homespun dignity, an earthy quality that reflects what was prominent and important in day-by-day living on the island of Great Britain 25 or more generations ago. In those days men, women, and children lived closer to their farm animals, their vegetable gardens, and to wild nature than most people do now.

As my collection has grown, and with the use of the Oxford Dictionary and other dictionaries, it has become clear to me that there is no need to seek obscure explanations for the greater number of the biologi-

[1] Received August 22, 1947.

cal surnames found. Nearly all of them, quite evidently, were taken directly from the names of living things of interest in everyday life in Britain before the discovery of America. Doubled consonants, final e's added, and some other departures from modern spellings are for the most part straightforward legacies from olden times.

My first adventure into the vast assemblage of American family names was by way of the Fresno, Calif., Telephone Directory. Since this modest book involved scanning only some 200 linear feet of columns—about 25,000 names—the entire list was searched.

There were 15 tree names listed in the Fresno book:

Ash	Elder	Maple
Bay	Elms	Palm
Cherry	Haw	Peach
Coffee	Holly	Pistacchio
Crabtree	Lemon	Thorn

And 22 varieties of plants which attract attention because of their beauty or utility:

Bean	Ivy	Rice
Bluett	Lilly	Rose
Chess	Mellon	Rue
Cotton	Moss	Rush
Daisy	Nutgrass	Sage
Dill	Pease	Stocks
Furze	Radish	
Grass	Reed	

General plant terms found were Bush and Herb, and plant parts were well represented among Fresno surnames, as follows:

Berry	Cobb	Root
Bloom	Cone	Shuck
Branch	Flower	Stump
Budd	Fruit	Trunk
Burr	Hull	Turnipseed

As might be expected, nearly all of the animal names referred to vertebrates. Fishes, so important to the island-dwelling British, were well represented. All refer to European species but all of their names have been transplanted for use in North America.

Bass	Pickerel	Salmon
Bream	Pike	Sturgeon
Darter	Pollack	Trout
Herring	Ray	Whiting
Perch	Roach	

Farther up the scale are the reptiles, represented by one name only: Asp.

Birds, being conspicuous and abundant as to species, were of frequent occurrence. There were 19 of them, and the majority are of rather large size:

Brant	Heron	Ruff
Coote	Kite	Sprigg
Crow	Knott	Swan
Duck	Martin	Swift
Eagle	Parrott	Wren
Finch	Peacock	
Hawk	Quail	

Excluding domesticated forms there were only 11 mammals, if Fisher is considered to be an occupational surname:

Badger	Fitch	Lion
Batt	Fox	Puma
Bear	Hare	Wolf
Fawns	Hart	

Among miscellaneous terms were the following:

Bird	Fish	Maiden
Child		

Anatomical terms were plentiful:

Beard	Hand	Pate
Brain	Head	Scales
Chin	Horn	Shank
Elbow	Joint	Venter
Furr	Lips	Wing
Gill	Lung	

Names of domestic animals, including poultry, number more than 50. There usually are separate designations for mature males and females, newborn young, juveniles of both sexes, and unsexed males. In addition, call-names and pet names have been used for centuries. Surnames based on these terms probably are nearly all pre-Columbian, since the only domesticated animals native to the Western Hemisphere that have been put to general use by the settlers of North America are the turkey and the muscovy duck. The dog was common to both the New World and the Old at the time of the discovery of the New.

In the Fresno Telephone Directory there were four surnames that refer to the names of farm animals:

Barrows	Lamb	Pigg
Bullock		

Following the page-by-page scanning of the Fresno directory it seemed necessary to change the method of hunting for surnames of biological origin. A detailed examination

of the 455 pages from Aabel to Zzylch in the San Francisco book and of the 1,032 pages of Los Angeles names from Aaen to Zylstra seemed too much of a project. Therefore, lists of terms that probably had been adopted as surnames were compiled. The chief sources of these were the indexes of reference books on botany, horticulture, and zoology. All the findings from both cities were combined and are listed here under several classifications.

Forage plants, small grains, fiber plants, etc.:

Bramble	Darnel	Milo
Bracken	Flax	Rye
Clover	Hemp	Timothy
Corn	Millet	Wheat

Vegetables, flavoring plants, etc.:

Carrott	Garlick	Mustard
Chard	Hops	Onions
Citron	Kale	Parsley
Clove	Leek	Pepper
Collard	Lettice	
Cress	Mangel	

Garden ornamentals, perfume plants:

Aster	Fern	Marigold
Balsam	Flagg	Pink
Broom	Heather	Poppy
Cosmos	Lavender	Primrose

Fruit and ornamental trees were:

Aspen	Hawthorne	Pine
Beech	Laurel	Plane
Box	Limes	Privett
Cedar	Linden	Shaddock
Figg	Medlar	

Other botanical terms in the San Francisco and Los Angeles telephone books were Nut, Plant, Posey, Spore, Stem, and Vine.

As was the case in the Fresno directory, the two leading Pacific coast cities revealed an extensive list of fishes:

Bleak	Eeles	Sauger
Carp	Fluke	Skates
Char	Haddock	Sole
Chubb	Ling	Spratt
Codd	Loach	Tench
Conger	Pilchard	Tunney
Dace	Puffer	
Drum	Rudd	

There was a single form of amphibian, Frogge, and one reptile, Turtle. The birds were even more abundant; 27 were found, not including Loon, a Chinese name:

Bunting	Jay	Rook
Bustard	Lark	Sparrow
Buzzard	Nightingale	Starling
Diver	Ostrich	Stilts
Dove	Partridge	Stork
Finch	Petrell	Swallow
Grebe	Rail	Thrush
Gull	Raven	Titmus
Hobby	Roller	Woodcock

Domestic animals were represented by the following useful inhabitants of the farmstead:

Boss	Dobbin	Jack
Bull	Dogge	Jenny
Burro	Donk	Kidde
Capon	Drake	Malkin
Catt	Filley	Mare
Cattell	Gander	Nanny
Chick	Gilt	Rabbitt
Cocke	Gosling	Shoat
Cockrell	Hogg	Steer
Colt	Hoggett	

Sixteen more mammals were trophies of the hunt:

Boy	Hind	Otter
Deer	Lemming	Panther
Elefant	Leopard	Sable
Elk	Mink	Tiger
Gibbon	Mole	
Grison	Moose	

The directories of San Francisco and Los Angeles provided the following additions to the list of anatomical terms:

Ankle	Finger	Nail
Arch	Fist	Ribbe
Arms	Gut	Sides
Back	Hair	Skinn
Bone	Hock	Teat
Bowell	Hoof	Thumb
Brow	Kidney	Thye
Cheek	Knee	Tongue
Eggs	Legge	Tooth
Eye	Maw	

Having had good hunting on the Pacific coast, I prepared for larger fields by adding to my list of unfound possibilities until it numbered about 625. Of much help were the many plants and animals illustrated in a dictionary, and I included in the list about 50 biological surnames encountered in general reading. All the latter were found subsequently in telephone directories of cities in the eastern part of the United States.

Giant among telephone directories is the Chicago book, because New York City sub-

scribers are grouped in several separate volumes based on the boroughs, and the third telephone city of the world, London, divides its directory into two volumes. From Aabad to Zyzik in the Chicago directory the distance was 1,741 four-column pages, a total column length of 6,021 feet.

From a systematic standpoint the most lowly among the surnames of plant origin in Chicago was Kelp, followed by Brake. Wild and cultivated plants, except trees, were as follows:

Aloe	Dock	Nettles
Anis	Ginger	Oats
Begonia	Gourd	Orris
Burdock	Honeysuckle	Thistle
Brier	Mallow	Tulip
Columbine	Marguerite	Violet
Caraway	Millet	Yarrow

There were 17 trees and shrubs, as well as the name Tree.

Alder	Filbert	Oak
Almond	Hazel	Olive
Birch	Hemlock	Quince
Cinnamon	Magnolia	Spruce
Cypress	Myrtle	Willow
Elm	Orange	

Names that refer to plant anatomy were:

Cedarleaf	Seed	Tuber
Peel	Straw	

Although lists already given include many fishes, there were still others in the Chicago directory:

Dolphin	Guppy	Shark
Goby	Hake	Snook
Gudgeon	Mullet	Wrasse

And still more birds:

Cardinal	Grouse	Robin
Crane	Merlin	Sora
Dipper	Owl	Snipe
Falcon	Pheasant	Teal
Flicker	Plover	Willet
Gannett	Pellican	

Among the following mammals were several additions to the list of domestic animals:

Baby	Lady	Ram
Buffalo	Lass	Stripling
Beaver	Man	Seal
Camel	Marten	Stag
Foale	Mule	Virgin
Ferret	Muskrat	Whale
Lad	Puss	

Chicago furnished additions, also, to the group of anatomical terms:

Belly	Gum	Pastern
Clawes	Heart	Quill
Fang	Heel	Rump
Feather	Kneebone	Talon
Flank	Liver	Wattles
Foot	Mane	Wool
Fin	Nape	

Following the expedition through the Chicago directory, the list of possibilities were checked through the 'phone books of Boston, Brooklyn, and Detroit. From Aaberg to Zynsky, in Boston, was a distance of 804 pages and 2,780 linear feet of columns; there were 784 pages in the Brooklyn book, from Aa to Zytynski; and the Detroit directory, from Aaberg to Zzzpt, was 910 pages in length. Trophies from all three hunts are combined in the lists which follow.

In Detroit I found Winston Churchill's famous trio of Blood, Sweat, and Tears. Other materials found in the three books were Butter, Milk, Ivory, and Breath.

The botanical names were these:

Awn	Larch	Saffron
Basil	Leaf	Savory
Belladonna	Lilac	Shamrock
Calla	Maize	Stock
Cassia	Poplar	Tea
Chicory	Raisin	Teasel

There were more fishes:

Dabbs	Goldfish	Shad
Elver	Grunt	Thresher
Gar	Lamprey	

One reptile, Blackadder, occurred.

In addition to the many species of birds recorded from directories previously examined, there were 10 in Boston, Brooklyn, and Detroit, with Brood for good measure.

Auk	Goose	Sheldrake
Bittern	Hen	Terns
Eider	Oriole	
Erne	Pullett	

A few more mammals:

Bunny	Goat	Squirrel
Ewe	Ratte	Weasel

And further anatomical names:

Antler	Ramus	Vein
Neck	Shoulder	Whisker

After having explored seven telephone directories I began to get the feel of the undertaking. A sense of the kind of words likely to be found as biological surnames had developed, so I went back over some of the indexes of botanical and zoological books.

More possibilities were obtained by scanning references on the botany and zoology of the British Isles. This was a pleasant experience because so many of the common names used in the mother country have been adopted here. On the other hand, many were wholly strange. If an American, reading about rural England, should find this statement: "Then I glimpsed an effet as it dashed from a patch of squitch and gobbled a mawk beneath a paigle," he would be confused. Having translated, he would find that a lizard had left its hiding place in couch grass (*Agropyron repens*) and eaten a maggot under a cowslip (*Primula veris*). We need to understand our neighbor's language better!

Several hundred possibilities resulted from this more effective approach. Equipped with the new list I hunted again through the telephone directories of Los Angeles, San Francisco, Chicago, Detroit, Boston, and Brooklyn. Using both lists, I then examined the Philadelphia Telephone Directory. The plants found in the seven books, omitting a number of unfamiliar ones, were as follows:

Arum	Cornel	Redwood
Balm	Crowfoot	Rosemary
Barley	Currant	Rust
Bent	Fennell	Senna
Bunt	Gale	Sorrel
Burnet	Gorse	Speedwell
Cabbage	Grape	Spelt
Calamus	Heather	Spice
Camphor	Hop	Thyme
Campion	Leatherwood	Tansy
Cane	Mayberry	Walnut
Caper	Mints	Woodbine
Celandine	Osier	Woodruff
Chives	Pear	Wormwood
Colliflower	Ramson	Yew

There were more plant parts:

Acorn	Cork	Spike
Bark	Gall	Twigg
Blossom	Pod	

Fishes were represented by:

Barbel	Grindle	Pogge
Brill	Gunnell	Ruffe
Burbot	Mackerell	Smolt
Cisco	Minnow	Sparling
Dace	Molla	Shiner
Flounders	Parr	
Fry	Pilchard	

Two of the surnames found were transfers from the names of amphibians: Asker, Eft. Three reptiles, Boa, Luth, and Serpente, were discovered.

Birds and their parts were as follows:

Biddy	Combs	Pinnock
Bill	Down	Pippitt
Bulfinch	Hummer	Spurr
Canary	Macaw	Tit
Chaffinch	Ortolan	Web
Chat	Peregrin	

Mammals and their structures were:

Body	Gazelle	Pore
Bruin	Goa	Roebuck
Chest	Hock	Tabby
Craw	Kitt	Wethers
Ermine	Knuckles	Withers
Farrow	Leverett	Wrinkle
Fleece		

Every collector at length awakens from his self-induced trance to admit a need for setting a limit to his enterprise. So, after Philadelphia, I decided to use the two long lists only once more, in London. But I couldn't drop certain unfound probabilities. Therefore I made a list of about 50 choice ones and set out to find them in the directories for Baltimore, Bronx, Cleveland, Houston, Long Beach, Manhattan, Milwaukee, Minneapolis, Newark, New Orleans, Portland (Oregon), Queens, St. Louis, San Diego, Seattle, and Washington. There were satisfactions in this search, since most of the surnames that turned up may be considered to be rarities. First, the plants, the last one being more recent than most biological surnames:

Bellrose	Scallion	Tobacco
Parsnip		

There was one fish, Girling (a young salmon), as well as several other vertebrates:

Chicken	Mouse	Pups

And some interesting anatomy:

Breast	Flesh	Nipple
Face	Hips	Tissue

Examination of the London Telephone Directory, of 2,209 three-column pages, from Aaggard to Zyrot, followed. I was in effect searching the "mother lode," the original source from which family names of English-speaking people have been scattered over the world. None of the following had been found in American lists.

Botanical surnames were:

Daphne	Majoram	Spurge
Iris	Madder	Sycamore
Lupine	Mold	Vetch

And, as always, a few additions to the long list of fishes:

Gargett	Flaice	Smelt
Grayling	Pout	Sucker

One amphibian, Newte, and three birds:

Condor	Gooney	Phoebe

The list of mammals included several of the few names of domesticated animals that had not been located before:

Boar	Girle	Stallion
Calf	Lynx	Stoat
Cow	Marmot	Voles
Gelding	Ox	

Anatomical terms were Beak, Chine, Hide, Skinn, Skull, Toe, and Wrist.

Invertebrates found in all directories are combined in a single list, which includes a few surnames associated with parts or products of backboneless animals.

Ant	Grubbs	Pupa
Barnacle	Honey	Scallop
Bee	Hornett	Shell
Beetle	Leach	Silk
Bot	Locust	Slug
Bug	Looper	Spider
Clam	Maddock	Sting
Cockle	Mantis	Tick
Coral	Moths	Warble
Crabb	Mussel	Wasps
Cricket	Oyster	Wax
Drill	Pearl	Winkle
Goldflies	Piddock	Worm

In the course of the investigation I recorded a number of surnames which have their origin in mythological persons and beasts:

Angel	Fairy	Indra
Atlas	Faun	Merman
Cherubin	Fay	Phoenix
Dragon	Genius	Satyr
Elf	Griffin	

Not so much mythological as fictional, Doe (John) and Roe (Richard), long prominent in the symbolism of the law, both refer to names of deer. Other imaginary persons were Punch and Judy.

Even after the good returns from my hunt through the London books, I was not satisfied. Missing were many surnames that could have escaped transfer from the names of common living things only by some improbable accident. I had located more than 300 fishes, amphibians, reptiles, birds, and mammals, but where were Donkey, Heifer, Hinny, Horse, Sheep, Toad, and Woman? About 100 family names were based on animal structures, but why had Jowl, Stomach, and Tail eluded search? Plant surnames to the number of about 200, not to mention some 35 terms for plant parts, had turned up, but not Lentil and Turnip. A fair representation of the small but useful invertebrates did not include the superlatively toothsome Lobster.

Are some of the "lost" families still occupying the same English farms where their family trees became established hundreds of years ago? Perhaps certain of the male lines have run out, or other names have been chosen. Possibly some are living in the United States outside of large cities. They may have no telephones. Some of them may be living in other countries.

According to an analysis of surnames recorded during the first United States Census,[2] the following families which I have been unable to find in telephone books were living in this country in 1790:

Bantam	Horse	Sealion
Heifer		

It is of interest to record that surnames found in the course of the First Census were 83.5 percent English and 91.8 percent from the British Isles.

In a final effort to find Horse, Sheep, and Turnip I looked in the telephone directories of Atlanta, Buffalo, Cincinnati, Columbus, Dallas, Dayton, Denver, Fort Wayne, Fort Worth, Indianapolis, and Pittsburgh; Montreal, Toronto, and Van-

[2] *A century of population growth.* From the First Census of the United States to the Twelfth, 1790–1900. U. S. Department of Commerce and Labor, Bureau of the Census. 303 pp., 1909.

couver, Canada; Melbourne and Sidney, Australia. Although the Turnipseed family is well distributed, Turnip still eluded me. I could get no closer to Horse than Horsey, which occurs plentifully. But I found Sheep. That is my *rara avis;* or, more accurately, *rara ovis!*

Those who write reports of the results of their research seldom mention one influence that helps to shape the course of their endeavors. I refer to the comments of wives. In my case attention was called to the possibility of sometime bringing the search to a close by a gentle remark, "I'm getting a little tired of seeing piles of telephone books around the house."

BOTANY.—*New species of trees from western Ecuador.*[1] ELBERT L. LITTLE, JR., Forest Service, U. S. Department of Agriculture.

The 19 new species here described and illustrated are from the author's collection of tree specimens made in 1943 in western Ecuador with the Latin American Forest Resources Project of the U. S. Forest Service. Genera represented are: *Heisteria, Hirtella* (2), *Brownea* (3), *Humiria, Erythrochiton, Tetragastris, Guarea, Trichilia, Belotia, Matisia* (2), *Clusia* (2), *Neosprucea, Symplocos,* and *Aspidosperma.* Twelve species are from the province of Esmeraldas, and others from the provinces of Pichincha, Chimborazo, Los Ríos, and El Oro. Additional new species from this collection are being published elsewhere by specialists, and others must remain undescribed at present because of incomplete material.

Type specimens have been deposited in the U. S. National Herbarium, Washington, D. C., and a set of isotypes in the herbarium of the U. S. Forest Service, Washington, D. C. Additional isotypes of most species are in the following herbaria: Tropical Forest Experiment Station, U. S. Forest Service, Río Piedras, Puerto Rico; Yale University School of Forestry, New Haven, Conn.; Chicago Natural History Museum, Chicago, Ill.; and Instituto Botánica, Universidad Central, Quito, Ecuador.

Acknowledgment is due C. V. Morton, of the U. S. National Museum, for assistance in checking the Latin diagnoses, to Ellsworth P. Killip, also of the National Museum, for suggestions, to Miss Leta Hughey, botanical artist, Forest Service, for making the drawings of the new species, and the late Dean Samuel J. Record, Yale University School of Forestry, for making generic determinations of wood samples of four of these new species. The Forest Service project in Ecuador is described in the following report: HOLDRIDGE, L. R., et al., *The forests of western and central Ecuador.* 134 pp., illus. Forest Service, U. S. Dept. Agr., Washington, D. C. 1947. (Processed.)

[1] Received October 3, 1947.

Heisteria cyathiformis Little, sp. nov.
Fig. 7

Sec. *Euheisteria* Engl. Frutex vel arbor parva 4 m alta, trunco 3 cm diametro, glabra, ramulis gracilibus teretibus viridulis, novellis subangulatis, internodiis brevibus 0.5–3 cm longis. Folia petiolata, petiolis 4–11 mm longis, supra leviter canaliculatis; laminae anguste ellipticae vel oblanceolatae, (5) 8–15 cm longae, 3–5.5 cm latae, basi acutae vel acuminatae, apice subabrupte acuminatae, acumine 4–9 mm longo, membranaceae, margine integrae, costa supra plana subtus elevata, nervis lateralibus utrinque 5–9, prope marginem arcuato-conjunctis, subtus prominulis. Flores fasciculares in axillis 2 vel 3; pedicellus 3 mm longus, apicem versus crassus; albastrum ca. 1.5 mm longum; calyx 1 mm longus ad medium 5-lobus, lobis triangularibus acutis; corolla in alabastro globoso-ellipsoidalis, 1.3 mm longa, viridulo-albida, 5-lobata, intus minute puberulenta; stamina 10, 5 longiora et 5 alternatim breviora; ovarium triangulare, apicem versus acuminatum, 1 mm longum, 1 mm diametro, 3-loculare ovulis 3, stigmate minuto sessili 3-lobato. Fructus solitarius, pedicello in stato fructifero 12–15 mm longo, calyce fructifero accrescente cyathiformi, 4–5 mm longo et 7 mm lato, truncato, subintegro vel minute 5-dentato, rubro; drupa ellipsoidalis, 11 mm long, 7 mm diametro, nigra.

Shrub or small tree 4 m tall and 3 cm in trunk diameter, said to become larger. Speci-

mens collected from two plants in wet tropical forest at Quinindé. "Aji."

ESMERALDAS: Quinindé, altitude 65 m, April 15, 1943, *Little 6263A* (Forest Service no. 96832; U. S. Nat. Herb. no. 1854915, TYPE). *Little 6263* (Forest Service no. 96833).

Heisteria Jacq. has more than 40 species in South and Central America and 3 in western Africa. Most species have the enlarged calyx of the fruit lobed and rotate, reflexed, or loosely enclosed the drupe. In *H. cyathiformis* the red, cup-shaped or hemispherical calyx is about one-third the length of the black, ellipsoidal drupe (red when immature) and closely adheres to the lower part of the drupe. This enlarged fruiting calyx is truncate and subentire or minutely 5-toothed. Superficially the fruit, with its elongated drupe and cuplike calyx, resembles that of some members of the Lauraceae, though the other characters are unlike that family. Caroline K. Allen and I. W. Bailey kindly have suggested that this material probably belongs in *Heisteria*, where it apparently is undescribed.

Heisteria cyathiformis is related to *H. cyanocarpa* Poepp. & Endl., of the Amazonian region of Brazil, Peru, and Ecuador, which has larger and thicker leaves, more flowers in a fascicle, and the fruiting calyx broad, orbicular, usually reflexed. The collection contains material of another species of this genus, doubtfully referred to the Central American species *H. macrophylla* Oerst.

Hirtella carbonaria Little, sp. nov.
Fig. 3

Arbor mediocris 12 m alta, trunco 25 cm diametro. Cortex laevis, griseus. Ramuli parce hirsutuli mox glabrescentes. Folia petiolata cum stipulis linearibus, ca. 3 mm longis, involutis, strigosis; petiolis ca. 2 mm longis, parce hirsutulis; laminae ellipticae, 5–9 cm longae et 2.5–4 cm latae, basi rotundatae, apice abrupte acuminatae, integrae, inflexae, coriaceae, reticulatae, supra glabrae, subtus in costa et venis pilis paucis subappressis praeditae, venis primariis 5–8-jugis, arcuatis et margine anastamosantibus, his cum costa utrinque paullo elevatis. Inflorescentiae terminales atque axillares, thyrsiformes, multiflorae, cum floribus multis abortivis, 6–9 cm longae et 2–4 cm latae, pedunculo 2–5 cm longo, rhachibus pilos paucos appressos gerentibus; bracteae triangulares, acutae, 1–2 mm. longae; pedicelli 3 mm longi; hypanthium campanulatum, 3 mm longum et 2 mm latum, externe sparse pubescens, intus glabrum; sepala 5, elliptica, obtusa, 3 mm longa et 2.5 mm lata, externe strigillosa, intus densius strigillosa; petala 5, alba, elliptica, 4 mm longa et 2.5 mm lata, retusa, glabra; stamina 3, 8–12 mm longa, filamentis glabris, basi connatis; staminodia 2, 1.5 mm longa; ovarium fere 2 mm longum, dense pilosum; stylus deorsum sparse pilosus, 10–15 mm longus. Drupa obovoidea, 15 mm longa, 8 mm lata, 3.5 mm crassa, compressa, atra, glabrescens, intus dense pilosa; semen ellipsoideum, compressum, fuscum, ca. 10 mm longum, 5 mm latum, 2.5 mm crassum.

Medium-sized tree to 12 m tall and 25 cm in trunk diameter. Bark smooth, gray. Wood used for charcoal, as the common and specific names indicate. Common in moist soil, flood plain forest near Río Nadadero, wet tropical forest zone at San Lorenzo. "Carbonero," "carboncillo."

ESMERALDAS: San Lorenzo, altitude near tidewater, April 19, 1943, *Little 6275* (Forest Service no. 96790; U. S. Nat. Herb. no. 1858838, TYPE).

Besides *Hirtella triandra* Sw., this collection contains two undescribed species of *Hirtella* L. *Hirtella carbonaria* has elliptic, coriaceous, glabrescent leaves that are turned inward slightly at the midrib. The pubescence of twigs, leaves, and inflorescence is rather sparse, consisting generally of a few appressed hairs, which are lost as the parts become nearly glabrous with age. The thyrsiform inflorescence contains many abortive flowers.

Hirtella pauciflora Little, sp. nov.
Fig. 2

Arbor magna 25 m alta, trunco 50 cm diametro. Cortex laevis, leviter fissilis, fuscus. Ramuli dense hirtelli. Folia petiolata cum stipulis linearibus, ca. 3 mm longis, dense hirtellis; petiolis 3–4 mm longis, dense hirtellis; laminae ellipticae, 7–13 cm longae et 3–5 cm latae, basi acutae, apice acuminatae, integrae, membranaceae, pallide virides, supra costis hispidae, pilis paucis rigidis in venis et venulis ferentes, mox glabratae, subtus in venis et venulis hispidae, nervis primariis 6–9-jugis, ascendentibus, his cum costa supra leviter impressis, subtus prominentibus. Inflorescentiae

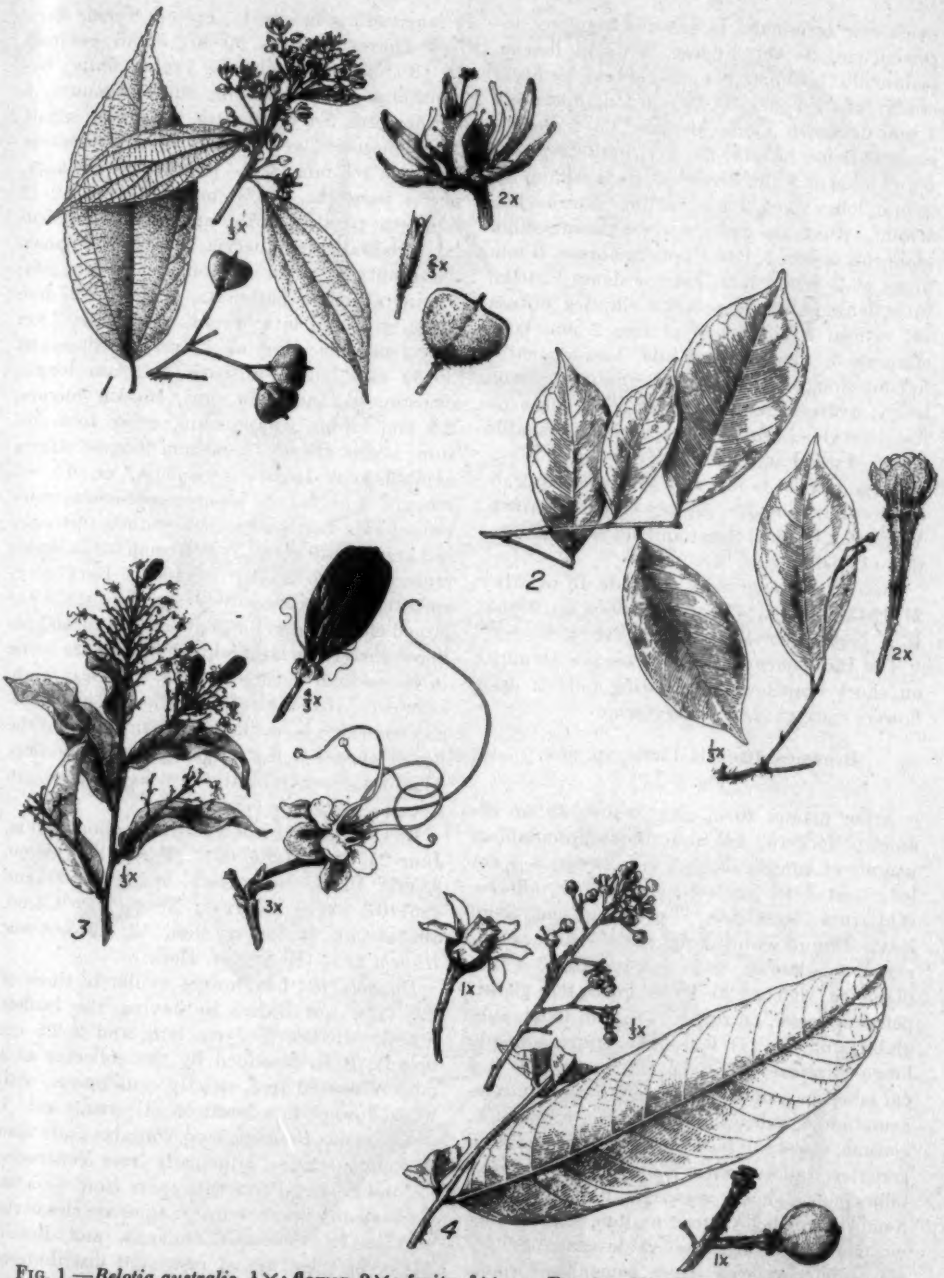

FIG. 1.—*Belotia australis*, ½×; flower, 2×; fruits, ½×. FIG. 2.—*Hirtella pauciflora*, ½×; flower, 2×. FIG. 3.—*Hirtella carbonaria*, ½×; flower, about 3×; fruit, ⅔×. FIG. 4.—*Guarea polymera*, ½×; flower, 1×; fruit, 1×.

racemosae terminales in ramulis brevibus, inconspicuae, 2- vel 3-florae, 3–6 cm longae, pedunculo hirtello, 1–4 cm longo; pedicelli crassi, inflati, lignei, 10–12 mm longi, basi fere 1 mm diametro, medio et apice 1.5–2 mm diametro, dense hirtelli; flores viridulo-fusci, ca. 5 mm longi et 5 mm diametro; hypanthium ca. 2 mm longum et 2 mm latum, externe hirtellum, intus fauce dense retrorse pilosum, alibi glabrum; sepala 5, late elliptica, obtusa, 3 mm longa et 2–3 mm lata, externe dense hirtella, intus dense puberula; petala 5, elliptica, obtusa vel retusa, 3 mm longa et fere 2 mm lata; stamina 3, filamentis glabris, basi connatis, 5–7 mm longis; staminodia 2, minuta, 0.2 mm longa; ovarium fere 2 mm longum, dense pilosum; stylus basin versus sparse pilosus, alibi glaber, 4 mm longus. Fructus deest.

Large tree 25 m tall and 50 cm in trunk diameter. Bark smooth, slightly cracked, brown. Virgin wet tropical forest and old cacao plantation at Pichilingue. "Coquito."

Los Ríos: Pichilingue, altitude 45 m, May 21, 1943, *Little 6475* (Forest Service no. 95855; U. S. Nat. Herb. No. 1876218, TYPE).

The inconspicuous, small racemes terminal on short branches and bearing only 2 or 3 flowers distinguish *H. pauciflora*.

Brownea disepala Little, sp. nov.
Fig. 9

Arbor magna 30 m alta; trunco 35 cm diametro, florifero, cum tumoribus ellipsoidalibus magnis et conspicuis, 3–5 cm crassis, 3–5 cm longis, et 3–10 cm latis, cicatricibus inflorescentiarum ferentibus. Cortex griseus, fere laevis; ramuli glabri. Folia paripinnata; petioli crassi, subglabrati, 6–15 mm longi et 3–4 mm diametro; rhaches 20–40 cm longi, fere glabri; petioluli crassi, corrugati, 3–5 mm longi, subglabri; foliolae (4) 6–9-jugae, oppositae, oblongo-ellipticae, (5) 9–12 cm longae, (2) 3–4 cm latae, basi inaequales, apice longe caudato-acuminatae, subcoriaceae, nitidae, reticulatae, glabrae, costae basi glande uno minuto gerentes. Inflorescentia caulina capitata, strobiliformis, globosa, sessilis, pallide incarnata, 5 cm diametro; bracteae multae, subrotundae vel ovatae vel oblongae, valde concavae, 1–7 cm longae, externe dense tomentosae, intus glabrae vel leviter pilosae, exteriores satis crassae et coriaceae, interiores membranaceae; rhachis 2.5–3 cm longa et 8–10 mm diametro, ad ⅓ longitudinis bracteata, apicem versus florifera. Flores multi (ca. 30–40), albidi; pedicelli 10–18 mm longi, pilosuli; vagina nulla; hypanthium campanulatum, subtetragonum, 8 mm longum, 5–6 mm latum, pilosulum; sepala 2, oblanceolata vel oblonga, apice bidentata dentibus 3–5 mm longis, pilosula vel glabrata, nervis parallelis, 30–50 mm longa et 10–15 mm lata; petala 4, longe angusteque unguiculata, glabrata, pinninervia, 2 majora oblanceolata, obtusa, 37–43 mm longa et 10 mm lata, 2 minora lineari-spathulata, acuta, 25–27 mm longa et 3 mm lata; vagina staminalis 3 cm longa, pilosula; stamina 17 vel 18, filamentis 25–50 mm longis, antheris 5–6 mm longis; ovarium stipitatum (6 mm), 15 mm longum, 2.5 mm latum, compressum, dense tomentosum; stylus glaber, 50–60 mm longus; stigma capitellatum. Legumen paucum, ca. 15 cm longum, 4 cm latum, plano-compressum, rufo-puberulum, valvis post dehiscentiam tortuosis.

Large tree 30 m tall and 35 cm in trunk diameter, distinguished by cauliflory. Bark gray, smoothish. Trunk easily recognized by the enlarged elliptical swellings at scars of former inflorescences. The large whitish flowers are borne in a headlike cluster from a spherical pink, bracteate, strobiliform bud about 5 cm in diameter which is sessile on the trunk. From the flower cluster a few large flat pods develop. Mountain (wet tropical) forest in southwestern Ecuador. "Palo de vaina."

EL ORO: Near Piedras, altitude about 800 m, June 21, 1943, *Little 6677* (Forest Service no. 98587; U. S. Nat. Herb. no. 1857106 and 1857107, TYPE). GUAYAS: Near Pedro Carbo, altitude about 300 m, Jan. 13, 1943, *Oscar Haught 3131* (U. S. Nat. Herb.).

Haught 3131 has flowers similar to those of the type but differs in having the leaflets slightly smaller (5–7 cm long and 2–2.5 cm broad). It is described by the collector as a moderate-sized tree, strictly cauliflorous, with white flowers, in a forest on calcareous soil.

The genus *Brownea* Jacq. contains more than 25 known species, principally from Venezuela, Colombia, and Peru, with more from Venezuela than any other country. Some species occur also in Panama, the Guianas, and Brazil. Many of these are of restricted distribution. Only one new species, *B. herthae* Harms, has heretofore been described from Ecuador. In addition to that species, this collection contains

FIG. 5.—*Brownea angustiflora*, ⅓×; flowers, about ¾×. 4×. FIG. 6.—*Tetragastris varians*. ⅓×; flower, FIG. 7.—*Heisteria cyathiformis*, ⅓×. FIG. 8.—*Brownea puberula*, ⅓×.

three new species of *Brownea*. Most species of *Brownea* have very showy, brilliant red flowers borne in terminal inflorescences. Very few species have white flowers and very few have cauliflory. *Brownea disepala* is odd in both ways in having white flowers borne in clusters on the trunks.

The segregate genus *Browneopsis* Huber (Bol. Mus. Goeldi 4: 565. 1906) was proposed for the species with sheath absent, larger number of stamens, and lesser development of petals (lacking, rudimentary, or 4). However, Ducke, Record and Hess, and Macbride have reduced the segregate to synonymy. Besides *Brownea disepala*, other species in this group are: *Brownea ucayalina* (Huber) Ducke, *Brownea cauliflora* Poepp. & Endl., *Brownea excelsa* (Pittier) Macbr., and *Brownea peruviana* Macbr. Of these, the new species is like the last in its calyx. Macbride (Field Mus. Bot. 13, pt. 3, no. 1: 134–135, 132. 1943) in the original description noted that *B. peruviana* was aberrant in having 4 petals and 2 colored, petaloid bractlets or sepals. After examining a specimen of one of the two collections cited by Macbride (*Klug 3810*), I interpret as sepals the two parallel nerved structures of both species attached in the usual position of the calyx, at the summit of the hypanthium and outside the four clawed, pinnately nerved petals. These sepals, which in both species are slightly 2-toothed or 2-lobed at the apex, may represent a reduction from 4 sepals to 2 connate ones. This interpretation is simpler than the alternate one also mentioned by Macbride of regarding the petals as absent, the 4 clawed petaloid structures as bractlets. In *Brownea* the bractlets or sheath, when present, are attached at the base of the hypanthium, not at the summit.

Brownea puberula Little, sp. nov.

Fig. 8

Arbor 6 m alta vel major, trunco 10 cm diametro. Ramuli, petioli, rhaches, et petioluli dense et minute fusco-puberuli vel demum glabrati. Folia paripinnata; petioli basi crassi, 5–40 mm longi; rhaches (3) 7–25 cm longae; petioluli 3–7 mm longi; foliolae (1) 3–7-jugae, oppositae, oblongo-ellipticae vel ovatae, (4) 7–12 cm longae, (2) 3–6 cm latae, basi inaequales, obtusae vel rotundatae, apice longe caudato-acuminatae (1.5–2.5 cm longa), coriaceae, supra glabrae, subtus minute puberulae, reticulatae, costae basi glande uno gerentes. Inflorescentiae terminales vel laterales, interdum ex rhachibus inflorescentiarum priorium; racemi breves, umbelliformes, rhache 2 cm longa, bracteis caducis; flores 15–25, rubri vel coccinei, spectabiles; pedicelli tenues, puberuli, 10–20 mm longi; vagina petaloidea tubulosa, bilabiata, 30–32 mm longa, externe appresso-puberula, intus glabra, lobis acutis 10–12 mm longis; hypanthium anguste tubulosum, 12–14 mm longum, 3 mm diametro, puberulentum vel glabratum; sepala 4, petaloidea, glabra, 24–27 mm longa, anterius obovatum, acutum, 8–11 mm latum, alia oblanceolata, obtusa, 4–6 mm lata; petala 5, fere aequalia, 37–46 mm longa, 9–13 mm lata, longe angusteque unguiculata, glabra, obovata, obtusa; stamina 11, 38–45 mm longa, ad ½ vel ⅔ longitudinis connata; vagina staminalis externe glabra, intus basi pilosa; filamentis glabris, 10–18 mm longis; antheris 2 mm longis; ovarium 7–8 mm longum, dense tomentosum; stylus tenuis, deorsum tomentosus, 27–35 mm longus; stigma capitellatum. Legumen 20 cm longum, 4.5 cm latum, planocompressum, minute fusco-tomentosum, valvis post dehiscentiam tortuosis.

Tree 6 m tall and 10 cm in trunk diameter. Uncommon in understory of wet, swampy tropical forests at sea level, including flood plain at edge of river and higher level of mangrove swamp forest at San Lorenzo.

ESMERALDAS: San Lorenzo, sea level, April 22, 1943, *Little 6338* (Forest Service no. 98230; U. S. Nat. Herb. no. 1909574, TYPE); April 22, 1943, *Little 6338A* (Forest Service no. 98231); April 19, 1943, *Little 6291* (Forest Service no. 96719). PROVINCE NOT KNOWN: Moist forest at foot of Western Cordillera, altitude 200 m, *Rimbach 183* (U. S. Nat. Herb.).

Rimbach 183, from an inland locality, was described by the collector as a tree 20 m high and 25 cm in trunk diameter, with red flowers in dense umbels, mostly from old wood, sometimes near base of trunk, and more rarely from the branches.

This species is unusual in the dense, minute, dark brown pubescence of the young branches, petioles, rachises, and petiolules. However, in age the pubescence may be nearly absent. The inforescences are fewer flowered and the flowers more nearly glabrous than in most species of *Brownea*. Though it has the bilabiate floral

sheath found in most species of the genus, *Brownea puberula* is distinct in the size, shape, and pubsecence of the floral parts. It resembles *B. birschellii* Hook. f., of Venezuela, which is glabrous and has much larger clusters of larger flowers. In publishing that species, J. D. Hooker (Bot. Mag. 98: *pl. 5998.* 1872) mentioned that "it closely resembles a species from the Pacific sea-coast of New Granada, at Esmeraldas, collected by Colonel Hall, and preserved in the Hookerian Herbarium." Hall's specimen, collected near the type locality of *B. puberula*, upon examination may prove to be a much earlier collection of this species.

Brownea angustiflora Little, sp. nov.
Fig. 5

Arbor parva 10 m alta, trunco 15 cm diametro. Ramuli glabri. Folia paripinnata, glabra; petioli basi crassi, 4–25 mm longi; rhaches 3–15 cm longae; petioluli 3–5 mm longi; foliolae 2–vel 3-jugae, oppositae, oblongo-ellipticae, (7) 10–23 cm longae, (3) 4–7 cm latae, basi inaequales, obtusae vel acutae, apice caudatoacuminatae (1–3 cm longo), coriaceae, reticulatae, costae basi glande uno gerentes. Inflorescentiae terminales et laterales vel caulines; racemi breves, umbelliformes, rhache 1.5–2 cm longa, bracteis caducis; flores ca. 15–20, rubrae vel coccineae, spectabiles; pedicelli tenues, puberuli, 9–12 mm longi; vagina petaloidea, anguste tubulosa, 35–52 mm longa, 6 mm diametro, uno latere ad 15–20 mm fissa, externe puberula, intus glabra; hypanthium anguste tubulosum, 11–15 mm longum, 2–2.5 mm diametro, glabrum; sepala 4, petaloidea, glabra, anterius oblanceolatum, acutum, 35 mm longum et 6–7 mm latum, alia linearia, acuta, 28–30 mm longa et 2–3 mm lata; petala 5, longe angusteque unguiculata, glabra, maximum oblanceolatum, retusum vel apiculatum, 42 mm longum, 6–8 mm latum, duo oblanceolata, retusa, 35–38 mm longa, 4–6 mm lata, duo linearia, obtusa, 20–22 mm longa, 1–2 mm lata; vagina staminalis 25–29 mm longa, glabra vel leviter pilosa; stamina 9 vel 10, filamentis 10–20 mm longis, antheris 2 mm longis; ovarium 9–10 mm longum, 2 mm latum, dense tomentosum; stylus tenuis, inferne tomentosus, 35–40 mm longus; stigma capitellatum. Legumen paucum, 20 cm longum, 4 cm latum, planocompressum, minute puberulum; valvis post dehiscentiam tortuosis; semina orbiculata, plana, 2.5 cm diametro.

Small tree 10 m tall and 15 cm in trunk diameter, in understory of wet tropical forest and in clearing. "Flor de mayo."

ESMERALDAS: Borbón, elevation 15 m, May 3, 1943, *Little 6418* (Forest Service no. 98232; U. S. Nat. Herb. no. 1879851, TYPE); April 26, 1943, *Little 6382* (Forest Service no. 98225).

Two collections of this species were made, both at the same locality. In the type collection, *Little 6418*, the inflorescences are terminal or lateral on the leafy branches. *Little 6382* has the flowers borne on the trunk and slightly larger and more mature.

This species is characterized by long, narrow, slender, nearly glabrous flowers in few flowered clusters. The narrowly tubular flower sheath, which is cleft on one side, is unusually long, 35–52 mm long, and nearly encloses the perianth, though the three larger petals are exserted. The sheath generally varies from 12 to 32 mm long in other species of *Brownea*. Only a few others, such as *B. coccinea* Jacq. and *B. aroensis* Pittier, have the sheath cleft on only one side instead of bilabiate.

Humiria procera Little, sp. nov.
Fig. 12

Arbor magna recta, 30–34 m alta vel major. Ramuli glabri, 4-alati ex foliis et costis decurrentibus, alis 1–2 mm latis. Folia disticha, decurrentia, sessilia, coriacea, vivo atroviridia, nitida, late elliptica, 8–13 cm longa et 5–7 cm lata, basi obtusa, apice abrupte et breviter acuminata (5–10 mm), margine remote glanduloso-crenulata, supra glabra, subtus minute rugulosa, costa subtus carinata, carina angusta, basi 1 mm alta, decurrente. Inflorescentia axillaris, corymbosa multiflora, 4–6 cm longa et 3–5 cm lata, puberula, ca. 5 vel 6 dichotoma vel trichotoma; bracteae triangulares, acutae, 1–2 mm longae; pedunculus alatus anceps, 2–2.5 cm longus; pedicelli 1 mm longi; flores minuti, viriduli, ca. 2 mm longi et 1.5 mm lati; sepala 5, rotundata, ciliata, leviter puberula, 1 mm longa; petala 5, oblonga, externe leviter puberula, 1.5–2 mm longa et 0.5 mm. lata; stamina 20, glabra, ca. 1.5 mm longa; filamenta basi connata; cupula hypogyna e squamis plus minus connatis composita; pistillum ca. 1.5 mm longum; ovarium ovoideum, parce puberulum, 5-loculare, ovulis 2 in loculo;

stylus crassus; stigma 5-radiatum. Drupa ovoidea vel ellipsoidea, base obtusa, apice acuta vel obtusa, tomentosa, 25–35 mm longa, 17–20 mm lata; endocarpium osseum, sub apice 5-foveolatum.

Large erect tree of forest canopy in wet tropical forest, 30 to 34 m tall and 40 cm in diameter, according to measurements from trees felled for wood samples, but becoming larger. The fruits resemble pecans (*Carya illinoensis* (Wangenh.) K. Koch) in size and shape. It is said that the oily seeds are edible. "Chanul."

ESMERALDAS: Playa de Oro, altitude about 65 m, May 1, 1943, *Little 6412* (Forest Service no. 95906; U. S. Nat. Herb. no. 1876214, TYPE; with wood sample). *Little 6413* (Forest Service no. 95907; with wood sample). San Lorenzo, altitude about 10 m, April 21, 1943, *Little 6320* (Forest Service no. 96880; with wood sample). Quinindé, altitude 65 m, April 9, 1943, *Little 6233* (old fruits only).

Common and probably widely distributed in the wet tropical forest of Esmeraldas. In some locations near San Lorenzo it comprises a large part of the big timber. Very common also along the banks of Río Santiago above Selva Alegre, where Chanuzal, a group of houses, apparently derives its name from the many trees of "chanul." After partial cutting of other tree species, "chanul" occurs in nearly pure stands. It exists in quantities along the main rivers and trails.

The South American genus *Humiria* Jaume St.-Hil. is distributed in Brazil, the Guianas, Venezuela, and Colombia and apparently has not been reported previously from Ecuador. Though the characteristic size is that of shrubs and small trees, two species are described as becoming large trees under favorable conditions. Selling (Svensk Bot. Tidskr. **39**: 257–269, illus. 1945) distinguished 6 living species and 3 fossil ones. The latter, based upon fruits from Brazil, Colombia, and Peru (Piura), indicated a broader distribution of the genus in the Tertiary than at present.

Wood samples of the Ecuadorian material were first determined by S. J. Record as *Humiria* sp. near *H. floribunda* Mart., which occurs in the Guianas, Amazonian Brazil, Venezuela, and Colombia. Subsequent study of herbarium specimens confirmed this determination and showed that an undescribed species was represented. *Humiria procera* is readily separated from other species of the genus by the numerous minute flowers only about 2 mm long, while the others have fewer, larger flowers usually about 4–5 mm long. In *H. procera* the twigs are prominently 4-winged and the leaves are distichous, abruptly acuminate, and crenulate, while in *H. floribunda* the twigs are only slightly winged, the leaves spirally arranged, smaller, usually obtuse at apex, and entire or nearly so. The distichous leaves distinguish *H. procera* from most species of the genus also.

The following notes on the wood of *Humiria procera* were made by J. Edson Myer, of the Forest Service field party. Sapwood grayish white, about 5 cm thick. Heartwood dull red, becoming brownish on exposure, hard and heavy, having a specific gravity of 0.68 based upon volume when green or 0.82 based upon volume when oven dry. Texture fine and uniform. Growth rings are indistinct due to fewer pores in denser zones; the pores are minute, thin walled, and numerous. The rays are very fine, not visible on cross section and low and inconspicuous on radial section. Wood fairly difficult to cut, rather harsh, readily polished, strong but brittle, and of medium durability. Not used much because of alleged silica content which dulls saws. Might be used for construction where not exposed to the weather.

Waterman (Trop. Woods **88**: 1–11. 1946 (1947)) included wood samples of the collections cited above in tests of decay resistance of water-soluble extractives of several tropical American woods to growth of wood-decay fungi. This species, listed as *Humiria* sp., was found to be nontoxic or not resistant to decay.

Erythrochiton carinatus Little, sp. nov.
Fig. 14

Sect. *Toxosiphon* (Baill.) Engl. Frutex vel arbor parva 2–5 m alta, trunco 5 cm diametro. Cortex griseus, leviter asper et fissilis, decorticans. Folia solitaria, unifoliata; petioli (2) 4.5–7 cm longi, 1.5 mm diametro, glabri, tenues, semiteretes, apice tumido-articulati; laminae oblongo-ellipticae, 11–20 cm longae et 5–8 cm latae, basi cuneatae, apice abrupte acuminatae, integrae, papyraceae, glabrae, inconspicue glanduloso-punctatae, venis lateralibus primariis ca. 12–14, angulo obtuso egredientibus, arcuatis, venulis reticulatis. Inflores-

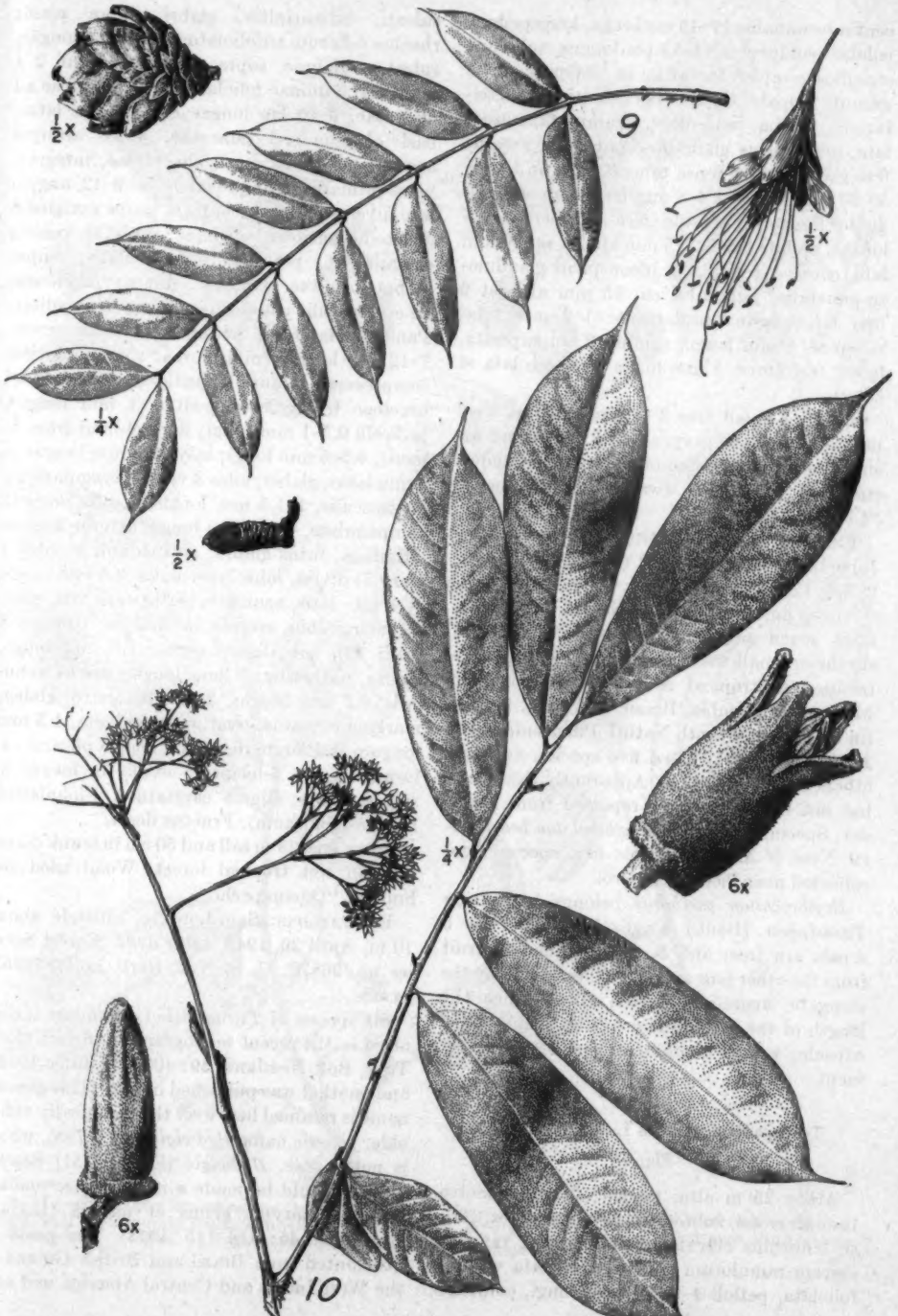

FIG. 9.—*Brownea disepala*, ¼×; axis of old inflorescence, ¼×; young globose, unopened inflorescence, ½×; flower, ½×. FIG. 10.—*Trichilia floribunda*, ¼×; bud, 6×; flower, 6×.

centia terminalis, 17–19 cm longa, longepedunculata; pedunculus 11–15 cm longus, sulcatus, strigillosus, apice furcatus, ca. 3-florus; flores desunt. Sepala libera, persistentia, bracteiformia, viridia, lanceolata, acuminata, reticulata, inconspicue glanduloso-punctata, externe fere glabra, intus dense tomentulosa, in fructu 30–37 mm longa et 4–8 mm lata, capsulis subduplo longiora; capsula fere ad medium 5-lobata, pallide viridis, 15 mm alta et ca. 20 mm lata, coccis 5, reticulatis, inconspicue glanduloso-punctatis, puberulis, ca. 15 mm altis et 9 mm latis, carina prominente 1–2 mm lata, mucrone 1 mm longo; semina 2, superposita, fusca, fere laeve, 5 mm longa et 4 mm lata et crassa.

Shrub or small tree 2 to 5 m tall and 5 cm in diameter. Bark gray, slightly rough and fissured, shredding. Common locally in understory of mountain (wet tropical) forest. "Chumi."

El Oro: Piedras, altitude about 500 m, June 18, 1943, *Little 6632* (Forest Service no. 98509; U. S. Nat. Herb. no. 1909573, TYPE).

The genus *Erythrochiton* Nees & Mart. contains seven previously described species of shrubs or small trees widely but sparingly distributed in tropical America from southern Mexico to Colombia, Brazil, and Peru. Engler (in Engler and Prantl, Natürl. Pflanzenfam. ed. 2, **19a**: 288. 1931) listed five species, and two others have been added. Apparently this genus has not heretofore been reported from Ecuador. Specimens of both *Erythrochiton brasiliensis* Nees & Mart. and this new species were collected near Piedras, El Oro.

Erythrochiton carinatus belongs to Section *Tozosiphon* (Baill.) Engl., in which the 5 sepals are free, and is distinguished in fruit from the other four species of this section by the elongate, acuminate sepals about twice the length of the capsule and by the deeply lobed capsule, with a prominent keel on each segment.

Tetragastris varians Little, sp. nov.

Fig. 6

Arbor 25 m alta, trunco 50 cm diametro. Ramuli crassi, subteretes, brunnescentes, glabri, lenticellis elevatis. Folia alterna, pinnata, apicem ramulorum versus trifoliolata vel unifoliolata, petioli 4–9 (21) cm. longi, evidenter sulcati, subancipites, glabri, supra plani; rhaches foliorum trifoliolatorum 2–4 cm longae, sulcatae, glabrae, supra planae; petioluli 2–4 mm longi; laminae foliolarum late ellipticae ad obovatae, 9–20 cm longae et 5–10 cm latae, basi obtusae vel cuneatae, apice abrupte acuminatae (5–10 mm), chartaceae, integrae, venis primariis utrinque latere ca. 9–12, angulo lato divergentibus, arcuatis et prope marginem anastomosantibus, utrinque venis et venulis elevatis et prominente reticulatis, supra glabrae, subtus glabratae, minute papillosae, ad costam pilis paucissimis appressis praeditae. Paniculae laterales apicem ramulorum versus, 7–12 cm longae, multiflorae; rhaches leviter compressae, minute strigillosae, bracteatae; bracteae triangulares, acutae, 1 mm longae; pedicelli 0.5–1 mm longi; flores 4-meri (raro 5-meri), 4.5–5 mm longi; calyx 2.5 mm longus et 3 mm latus, glaber, lobis 3 vel 4, triangularibus, acutiusculis, 1–1.5 mm longis, corolla anguste campanulata, 4.5–5 mm longa, externe minute strigillosa, intus glabra, ad medium in lobis 4 (raro 5) divisa, lobis lanceolatis, 2.5 mm longis et 1 mm latis, acutis, valvatis, carinatis, crassis, marginibus apiculoque inflexis; stamina 8 (raro 10), sub disco inserta, 1.5 mm longa, glabra, antheribus 1 mm longis; discus annularis, 0.7 mm longus, 2 mm diametro, glaber, margine crenatus; ovarium ovoideum, 1.5 mm longum et 1.3 mm diametro, sparse pilosum, 4-loculare (raro 5-loculare) ovulis in loculis 2; stylus brevis; stigma capitatum, 4-lobulatum (raro 5-lobulatum). Fructus deest.

Large tree 25 m tall and 50 cm in trunk diameter, in wet tropical forest. Wood used for lumber. "Quemapecho."

Esmeraldas: San Lorenzo, altitude about 10 m, April 20, 1943, *Little 6292* (Forest Service no. 96876; U. S. Nat. Herb. no. 1877653, TYPE).

Six species of *Tetragastris* Gaertn. are recognized in the recent monograph by Swart (Rec. Trav. Bot. Neerland. **39**: 403–419, illus. 1942), and another was published in 1939. This generic name is retained here over the technically valid, older generic name *Hedwigia* Sw. (1788), which is not in use. *Hedwigia* [Ehrh. 1781] Beauv. (1805) should be made a *nomen conservandum* for a monotypic genus of mosses (Little, Bryologist **46**: 114–115. 1943). The genus is distributed from Brazil and British Guiana to the West Indies and Central America and now

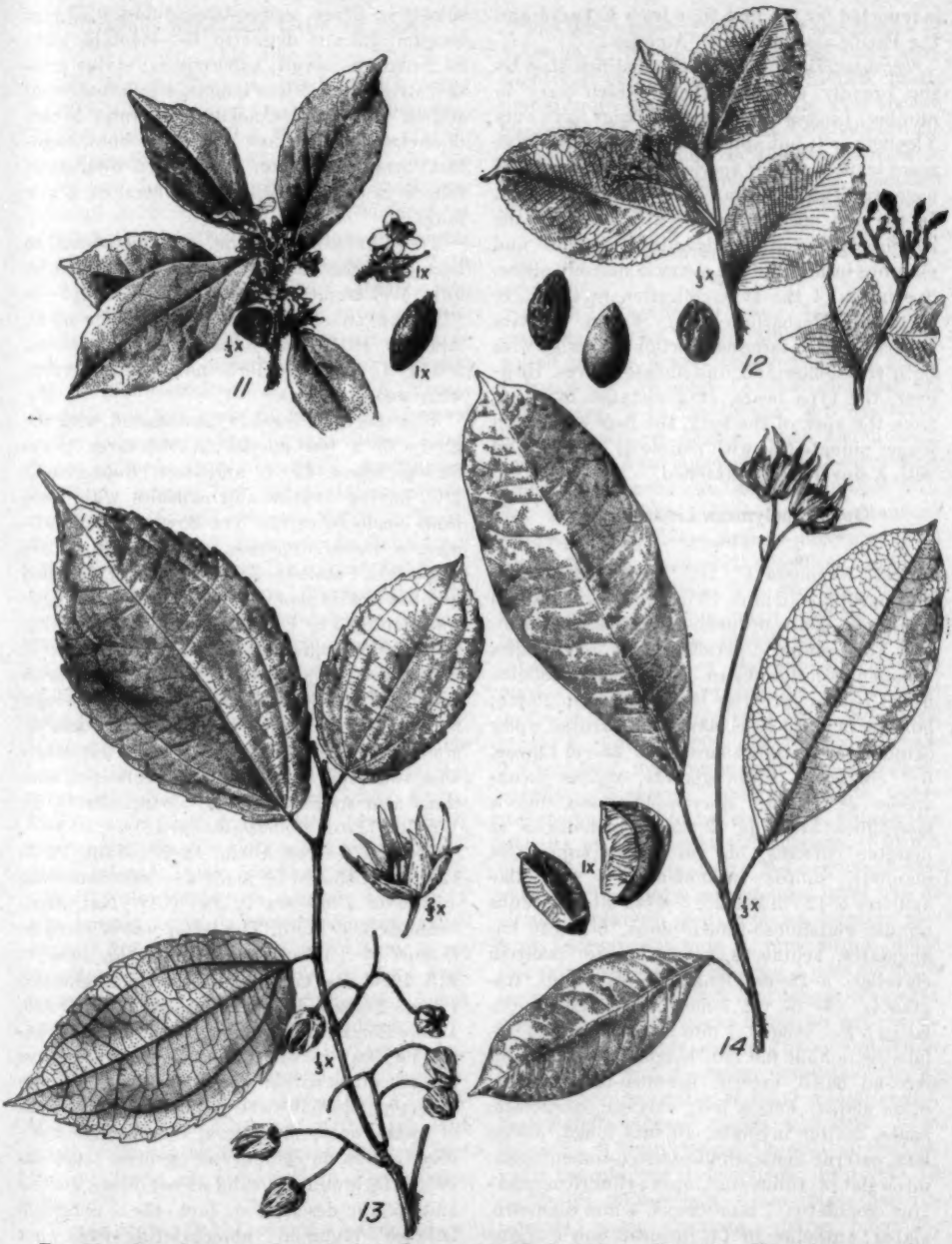

FIG. 11.—*Symplocos ecuadorensis*, ⅓×; flowers, 1×; fruit, 1×. FIG. 12.—*Humiria procera*, including fruit and two old fruits showing bony endocarp, all ⅓×. FIG. 13.—*Neosprucea pedicellata*, ⅓×; flower ⅔×. FIG. 14.—*Erythrochiton carinatus*, ⅓×; carpels of fruit, 1×.

is reported for the first time from Ecuador and the Pacific slope of South America.

Tetragastris varians is easily distinguished by the broadly elliptic leaflets, which vary in number. Leaves at the ends of twigs have only 3 leaflets or 1, but apparently some leaves have more leaflets. Other species of the genus have narrower leaflets, 5 (rarely 3) to 11 in number. In the new species the calyx is glabrous, the corolla is minutely strigillose outside and glabrous inside, and the ovary is sparsely pilose. Specimens of the type collection in the U. S. National Herbarium and Forest Service Herbarium are terminal portions of twigs with both trifoliolate and unifoliolate leaves. However, the type bears, at a distance of 30 cm from the apex of the twig, the base of a much longer pinnate leaf with petiole 21 cm long and with a single leaflet attached.

Guarea polymera Little, sp. nov.
Fig. 4

Sect. *Euguarea* C. DC. Arbor 12 m alta, myrmecophila, trunco 15 cm diametro. Ramuli minute et dense brunneo-glanduloso-tomentulosi. Folia pinnata; petioli 6–7 cm longi, supra canaliculati; rhaches ca. 26 cm longi; foliolae 6- vel 7-jugae, breviter (4–5 mm) petiolulatae; laminae oblongo-lanceolatae, base acutae, apice acuminatae, membranaceae, 20–23 cm longae, 6–7 cm latae, supra glabrae, subtus inconspicue et minute cinereo-puberulae, nervis lateralibus utrinque 12–15, ascendentibus et margine curvatis, his cum costa supra fere planibus, subtus prominentibus. Paniculae axillares 6–12 cm longae, 3–6 cm latae, ramulis minute glanduloso-tomentulosis, bracteae triangulares, acutae, 2–3 mm longae; pedicelli clavellati 5–15 cm longi. Flores albidi, fragrantes, (5) 6- vel 7-meri, calyx late cupulatus, 3 mm longus, 7 mm latus, leviter 10–16-lobatus, lobulis 0.5 mm longis, mox 3–4-fissus fere ad basin, externe brunneo-tomentulosis, intus glaber. Petala 5–7, valvata, lanceolata, acuta, leviter involuta, 10 mm longa, 3 mm lata, externe dense albido-sericeo-tomentulosa, intus glabra; tubus stamineus cylindricus, margine crenulatus, 7 mm longus, 4 mm diametro, glaber; antherae 10–14, inclusae, sub margine sessiles, 1.5 mm longae; gynophorum 1 mm altum, glabrum, apice annulum glandulosum gerens, 4 mm diametro; ovarium ovoideum, sulcatum, dense sericeo-tomentulosum, 3 mm longum, 2.5 mm diametro, 6–8-loculare, loculis 2-ovulatis, ovulis superpositis; stylus crassus, strigillosus, 3 mm longus, 1 mm diametro; stigma crassum discoideum, glabrum, 2 mm diametro. Capsula fere matura globosa, rugulosa, brunnea, 11 mm diametro, 6–8-loculare; semina in loculo 2 superposita, atra, ca. 3 mm longa.

Tree 12 m tall and 15 cm in diameter, said to become larger. Twigs hollow and inhabited by ants. Wet tropical forest. "Pialde macho."

ESMERALDAS: Playa de Oro, altitude 65 m, April 30, 1943, *Little 6404* (Forest Service no. 98254; U. S. Nat. Herb. no. 1877588, TYPE; with wood sample).

This specimen is readily associated with the group of a few species in the large genus *Guarea* Allem. ex L. and Sect. *Euguarea* C. DC. having ovaries and capsules with more than 5 cells (6 to 12). The flowers are 6- or 7-merous, rarely 5-merous, and the ovaries are 6–8-celled. Petals are 5 to 7, instead of the usual number in this genus, 4 or 5. The wood sample was identified by S. J. Record as *Guarea*. Other species with approximately the same number of carpels are *G. purusana* C. DC., of Amazonian Brazil, with 6–9-celled ovary but much larger fruit and dense brownish pubescence, and *G. grandifolia* DC., of Guiana, 7-celled but otherwise 4-merous. This Ecuadoran collection contains also specimens of *G. syringoides* C. H. Wright (?) and *G. trichilioides* L.

Perhaps *Guarea* Allem. ex L. (Mant. Pl. **2**: 150. 1771) should be made a *nomen conservandum* over *Elutheria* P. Br. (Civ. Nat. Hist. Jamaica 369. 1756). The latter was referred to *Guarea* by Fawcett and Rendle (Fl. Jam. **4**: 215. 1920) and cited by Harms (in Engler and Prantl, Natürl. Pflanzenfam. ed. 2, **19bI**: 129. 1940). Rendle (Journ. Bot. **50**: 129. 1912) contended that it was unnecessary to conserve names against earlier names by Patrick Browne observing that Browne published descriptions of species only, not genera. Whether Browne's descriptions in monotypic genera, such as *Elutheria*, would be valid as combined generic and specific descriptions (art. 43) is uncertain because binomial nomenclature was not adopted. Nevertheless, several generic names of Browne having priority have formally been made *nomina rejicienda*.

Trichilia floribunda Little, sp. nov.
Fig. 10

Sect. *Moschoxylum* (A. Juss.) C. DC. Arbor 10–20 m alta vel major, trunco 20 cm diametro. Ramuli minute strigillosi. Folia alterna, magna, imparipinnata; petioli 8–11 cm longi; rhaches 30–35 cm longae; foliolae 11–14, alternae; petioluli 5–12 mm longi; petioli, rhaches, et petioluli minute strigillosi; laminae foliolarum oblanceolatae, (11) 25–33 cm longae et (5) 7–10 cm latae, infimae minores, basi acutae, apice acutae, integrae, subcoriaceae, supra glabrescentes, subtus minute et sparse puberulentae vel glabrescentes, nervis lateralibus utrinque (9) 20–25, ascendentibus, marginem versus curvatis, his cum costa supra fere planibus vel leviter impressis, subtus prominentibus. Paniculae axillares, corymbiformes, multiflorae, 20–30 cm longae, fere 20 cm latae, ramulis strigillosis; pedicelli tenues, 1–2 mm longi; flores flavo-albidi, fragrantes; alabastrum oblongo-ovoideum, 6 mm. longum et 2–2.5 mm latum; calyx patelliformis, brevissimus, subinteger vel leviter 4- vel 5-lobulatus, 0.5 mm longus et 2.5 mm latus, externe strigillosus, intus glaber; corolla in alabastro 6 mm longa et 2–2.5 mm diametro, externe dense cinereo-strigillosa, intus glabra; tubus cylindricus, 4-lobatus (raro 3-lobatus) fere ad medium, lobis lanceolatis, obtusis, cucullatis, valvatis, leviter involutis; tubus stamineus urceolatus, 4 mm. longus, apice 6–8 denticulatus (denticulis 1 mm longis), externe glabrescens vel parce appresso-pilosus, intus hirtellus; antherae 6–8, vulgo 7, inter denticulos insertae, exsertae, 1 mm longae; ovarium ovoideum, cum gynophoro 1.5 mm longum et 1 mm latum, dense strigillosum, 2- vel 3-loculare, loculis 2-ovulatis; stylus tenuis, inferne strigillosus, 1.5 mm longus; stigma clavatum. Fructus deest.

Tree 10–20 m tall and 20 cm in diameter, reported to become a large tree of forest canopy. Wood said to be used for axe handles. Possibly of ornamental value because of the abundant small, yellowish-white, fragrant flowers. Wet tropical forest of northwestern Esmeraldas. "Pialde."

ESMERALDAS: San Lorenzo, altitude 10 m, April 21, 1943, *Little 6323* (Forest Service no. 96852; U. S. Nat. Herb. no. 1877646, TYPE); Borbón, altitude 15 m, April 26, 1943, *Little 6372* (Forest Service no. 98283; with wood sample).

The very numerous flowers in this species of *Trichilia* P. Br. have a saucerlike calyx very slightly 4- or 5-lobed, and the 4-lobed corolla united more than half its length. This species has relatively large leaves and leaflets for the genus. S. J. Record named the wood sample as *Trichilia*. Also represented in this collection are *T. hirta* L and *T. macrophylla* Benth.

Belotia australis Little, sp. nov.
Fig. 1

Arbor 18 m alta vel major; trunco 35 cm. diametro. Cortex glaber, albidus. Ramuli et petioli minute dense stellato-puberuli, grisei. Petioli 8–15 mm longi. Laminae ellipticae vel lanceolatae, 9–14 cm longae, 3–6 cm latae, basi obtusae vel acutae, apice acuminatae, acumine 1–1.5 cm longo, glanduloso-serrulatae, 3-nervatae, chartaceae, discolores, supra virides, minute sparse stellato-puberulae, subtus griseae, minute dense stellato-puberulae, pilis paucis stellatis majoribus praeditae. Inflorescentia cymosa axillaris, 3–6 cm longa, ca. 10-flora; pedicelli 3–6 mm longi; bracteae lanceolatae, 2–4 mm longae, interdum 2- vel 3-dentatae; pedunculus et pedicelli bracteaeque minute dense stellato-puberulae, griseae; alabastra ca. 8 mm longa; flores 10–11 mm longi; sepala 5, rubella, lanceolata, 9–11 mm longa, 2.5 mm lata, margine involuta, apice obtusa, cucullata, 5-nervata, externe minute dense stellato-puberula, intus fere glabra, pilis paucis stellatis praedita; petala 5, ligulata, 8–9 mm longa, 1.5 mm lata, apice 2–4-dentata, 5-nervata, externe sparse pubescentia, intus basi et circum nectarium stellato-pilosa, ceterum glabra; androgynophorum 1 mm altum, apice discum dense stellato-pilosum 3 mm diametro ferens; stamina 15, 2–3 mm longa; filamenta deorsum stellato-pilosa; antherae suboribculares, 0.3 mm longae; ovarium ovoideum, 3 mm longum, 2.5 mm diametro, dense pilosum, 2-loculare, ovulis paucis; stylus 3–4 mm longus, basi stellato-pilosus; stigma 4-lobatum, lobis laciniatis, 0.5 mm longis. Capsula bilocularis, valde obcompressa, loculicida, brunnea, 15 mm longa, 20 mm lata, 4 mm crassa, basi rotundata, apice truncata, sparse puberula, pilis minutis stellatis et pilis stellatis multo longioribus interspersis, stylo persistente cuspidato 3 mm. longo coronata. Semina desunt.

Tree 18 m tall or larger, and 35 cm in diame-

ter. Bark smooth, whitish. The light-weight wood is sometimes mixed with that of balsa (*Ochroma lagopus* Sw.) and substituted for the latter. Scattered in cutover wet tropical forest and fields at San Lorenzo but not common. "Chillarde." Also improperly called "balsa."

ESMERALDAS: San Lorenzo, altitude about 10 m, April 19, 1943, *Little 6273* (Forest Service no. 96826; U. S. Nat. Herb. no. 1858843, TYPE; with wood sample).

In the genus *Belotia* A. Rich., T. A. Sprague (Kew Bull. 1921: 270–278. 1921) distinguished 11 species, including 6 new, distributed from southern Mexico through Central America to Panama and in Cuba and Santa Lucia in the West Indies. A. A. Bullock (Kew Bull. 1939: 517–521. 1939) later examined additional material and reduced the number of species to 9. Sprague predicted that this genus might be found later in the Pacific coast forests of Colombia, and this collection represents a further southward extension of *Belotia* to Ecuador.

Belotia australis is related to *B. panamensis* Pittier (*B. macrantha* Sprague) of Panama. Pubescence in the former is finer, more minute, and gray, while the latter has the twigs and branches of inflorescence coarsely ferrugineous tomentose. The leaves of *B. panamensis* usually are larger, rounded or obtuse at base, and with teeth more prominent. The under surface of the leaves in *B. australis* has finer pubescence with the larger hairs of the upper tier scattered and fewer. The flowers of *B. panamensis* are slightly larger. Capsules in both species are similar in size and shape, but those of *B. panamensis* are much more densely stellate pubescent and have shorter styles less than 3 mm long.

Sprague noted that the common name "balsa," which is applied to *B. australis*, is used also in British Honduras for *B. campbellii* Sprague.

Matisia alata Little, sp nov.
Fig. 16

Arbor 20 m. alta, trunco 20–30 cm diametro. Ramuli et petioli minute stellato-tomentosi, pilis flavis, radiis numerosis, brevissimis, glandulosis, demum glabrescentes. Folia magna petiolata, petiolis 2–5 cm longis; laminae oblongo-obovatae, 15–38 cm longae, 8–18 cm latae, basi subrotundatae vel leviter cordatae, apice acutae, margine integrae vel obscure undulatae, penninervis, nervis lateralibus 9–12 utrinque latere, prope marginem arcuatis et anastomosantibus, subtus elevatis, venulis prominente reticulatis, supra glabratae, subtus sparse et minute stellato-puberulae. Flores solitarii, oppositifolii, 2 vel 3 apice ramulorum, magni, 7 cm longi; pedicellus crassus, curvatus, fulvus, 4–7 cm longus, 3 mm diametro; calyx anguste campanulatus, 45 mm longus, 22 mm diametro cum alis, basi attenuatus, crassus, plus minusve succulentus, ochraceus, dense et minute stellato-tomentosus, pilis glandulosis, intus dense sericeus, lobis 5 brevibus, acutis, 3–5 mm longis, alis 10, longis, angustis, usque ad 6 mm latis; petala 5, ochracea, 70 mm longa, basi connata tubo 2 mm, limbo spatulato vel obovato, obtuso, ca. 32 mm longo et 15–18 mm lato, externe dense stellato-tomentoso, intus glabro; columna staminea longe exserta, leviter curvata, 5 cm longa, 5-lobata, lobulis leviter pubescentibus, 10–16 mm longis, antherarum loculis 4–6 linearibus; ovarium 5-lobatum, 5-loculare, 3 mm longum, stellato-tomentosum; stylus 60 mm longus, 10 mm exsertus, curvatus, stellato-tomentosus; stigma capitatum, 2 mm longum. Fructus globosus, succulentus, ochraceus, magnus, 8–10 cm diametro, calyce accrescente 6–7 cm longo, cum alis 4–10 mm latis, suffultus.

Tree 20 m tall and 20–30 cm in trunk diameter. It is said that the large, fleshy fruits are edible. Observed also at San Lorenzo, Esmeraldas. Wet tropical forest of Esmeraldas and Pichincha, northwestern Ecuador. "Sapote," "sapotillo."

ESMERALDAS: Quinindé, altitude 65 m, April 12, 1943, *Little 6244* (Forest Service no. 96751; U. S. Nat. Herb. no. 1858828, TYPE). PICHINCHA: between Santo Domingo de los Colorados and Quinindé, April 7, 1943, *Little 6197* (Forest Service no. 96867); April 8, 1943, *Little 6200* (Forest Service no. 96785; in fruit).

More than 20 species of the genus *Matisia* H. B. K. have been described, a third of these in 1945–1946. This genus of small to medium-sized trees ranges from Brazil to Colombia and Ecuador and north to Panama and Costa Rica. Some of the species apparently are of local range. In this Ecuadorian collection are *M. cordata* Humb. & Bonpl., a cultivated species, *M. coloradorum* R. Benoist, an Ecuadorian species found again at the type locality, and two species proposed here as new.

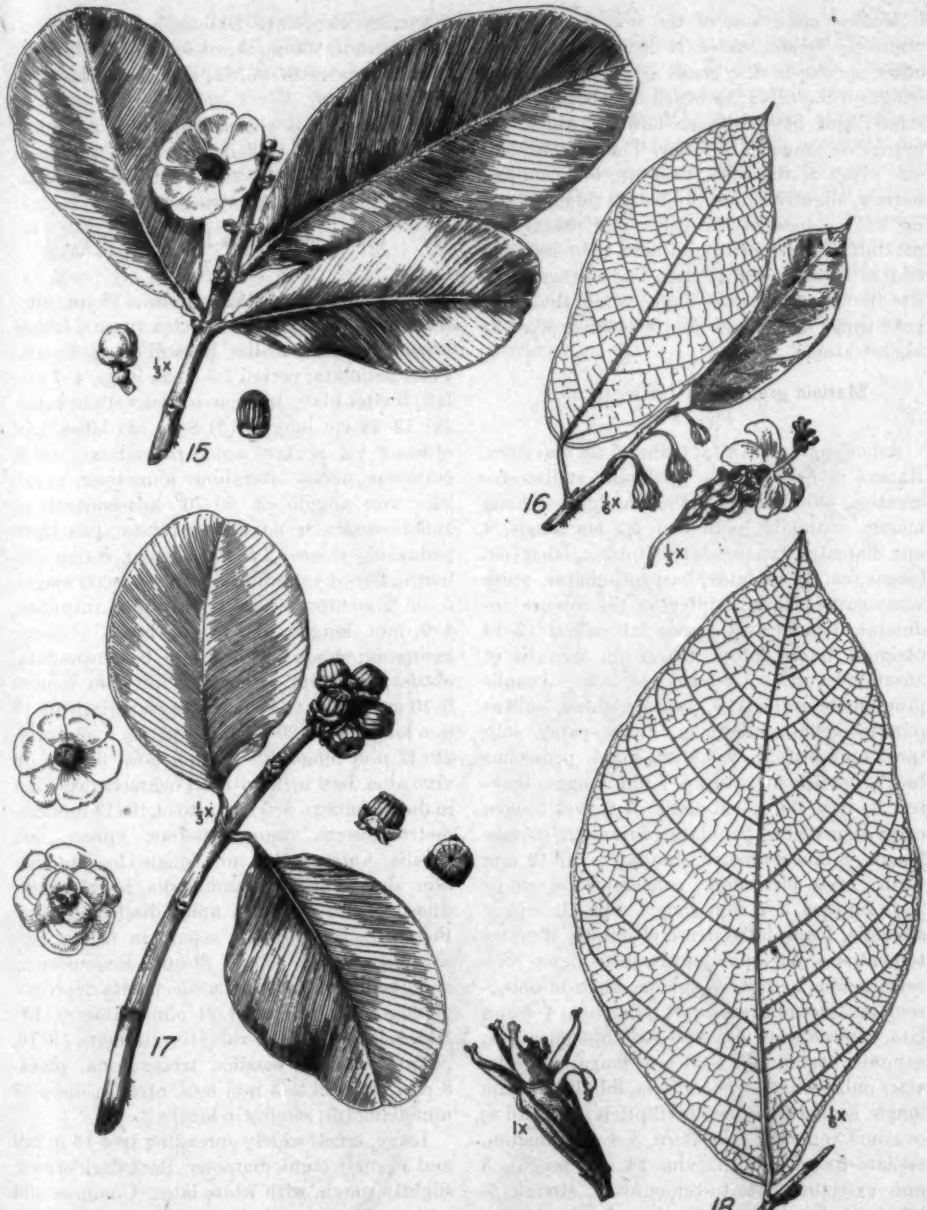

FIG. 15.—*Clusia polystigma*, including bud and immature fruit, all ⅓×. FIG. 16.—*Matisia alata*, ⅛×; flower, ⅓×. FIG. 17.—*Clusia plurivalvis*, including separate staminate flowers and fruits, all ⅓×. FIG. 18.—*Matisia grandifolia*, ⅛×; flower, about 1×.

Matisia alata, one of the few species with pinnately veined leaves, is distinguished from other species of the genus by the prominent wings on the calyx, to which the specific name refers, and by the large flowers, which are orange or brownish in color. The 10 conspicuous wings of the calyx tube are longitudinal, narrow, slightly curled projecting ridges, starting at the base of the calyx and reaching a maximum width of 6 mm. near their rounded ends of the apex of the calyx. The 5 wings opposite the calyx lobes are larger, while the alternate wings are smaller and shorter or may be almost absent.

Matisia grandifolia Little, sp. nov.
Fig. 18

Arbor parva, 5 m alta, trunco 5 cm diametro. Ramuli et petioli dense et minute stellato-tomentosi, pilis multiradiatis, glandulosis. Folia magna, petiolata, petiolis 1–1.5 cm longis, 4 mm diametro; laminae late ellipticae, 50–60 cm longae, ca. 28 cm latae, basi rotundatae, apice acuminatae, margine integrae vel obscure undulatae, penninervis, nervis lateralibus 12–14 utrinque latere, prope marginem arcuatis et anastamosantibus, subtus elevatis, venulis prominente reticulatis, supra glabrae, subtus minute stellato-puberulae. Flores pauci, solitarii, oppositifolii, 3–3.5 cm longi; pedicellus brevis, leviter curvatus, 5–7 mm longus; bracteis 3, basi floris, subulatis, 3–6 mm longis; calyx anguste campanulatus, fulvus, 22–25 mm longus, 8 mm diametro, uno latere 10–12 mm fissus, lobis plerumque cohaerentibus, saepe 2–4, sinubus 2–7 mm longis, alis 10 longis, angustis, 1 mm latis, dense et minute stellato-tomentosus, pilis glandulosis, intus dense sericeus, petala 5, in sicco rubida, anguste oblanceolata, apice obtusa, 30–34 mm longa, 4–5 mm lata, externe apice appresso-stellato-tomentosa; columna staminea 17–20 mm longa, apice leviter pubescens, 4- vel 5-lobata, lobulis 3–9 mm longis, antherarum loculis ellipticis usque ad 8; ovarium conicum, 5-loculare, 3–4 mm longum, stellato-tomentosum; stylus 24 mm longus, 3 mm exsertus, stellato-tomentosus; stigma 5-lobatum, lobulis obtusis, fere 2 mm longis. Fructus deest.

Small tree 5 m tall and 5 cm in diameter, said to become larger. One tree seen in cacao plantation, wet tropical forest area. "Penimón."

PICHINCHA: Santo Domingo de los Colorados, altitude 560 m, April 7, 1943, *Little 6146* (Forest Service no. 96782; U. S. Nat. Herb. no. 1858834, TYPE).

This species is characterized by unusually large, pinnately veined leaves, by the short pedicels, and by the calyx split on one side, with 10 narrow wings or ridges.

Clusia plurivalvis Little, sp. nov.
Fig. 17

Arbor dioica, recta, extensa, 15 m alta, trunco 30 cm diametro. Cortex fuscus, leviter asper, fissus, latice alba. Ramuli crassi, teretes. Folia petiolata; petioli 1.5–4 cm longi, 4–7 mm lati, leviter alati; laminae ovales vel obovatae, (8) 12–24 cm longae, (5) 8–14 cm latae, basi obtusae vel acutae, apice rotundatae, valde coriaceae, nervis lateralibus numerosis, parallelis, sub angulo ca. 60–70° adscendentibus. Inflorescentia terminalis, capitata, pauciflora pedunculo crasso, 2.5–4 cm longo, 6 mm diametro, floribus sessilibus. Flores masculi magni, 5 cm diametro; bracteae calycinae rotundae, 4–9 mm longae, 8–13 mm latae, obtusae, carinatae; sepala 4–6, biseriata, late rotundata, obtusa, concava, coriacea, 2 inferiora minora 6–10 mm longa et 15 mm lata, superiora 10–15 mm longa et 12–20 mm lata; petala 5, obovata, 28–32 mm longa, 20–25 mm lata, obtusa, in vivo alba, basi incarnata vel ochracea; stamina in disco convexo 5–6 mm alto et 10–13 mm diametro inserta, numerosissima, spissa, fere sessilia, antheris 1.5 mm longis, longitudinaliter dehiscentibus; staminodia in globo resinoso 5 mm diametro apice disci aggregata. Flores feminei desunt; sepala in fructu persistentia, similia sepalis florium masculorum; staminodia nulla. Capsula succulenta depresso-globosa, 17 mm alta et 21 mm diametro, 13–16-locularis et 13–16-valvatis; stigmata 13–16, peltata, radiata, sessilia, triangularia, plana. 8 mm longa et 2–3 mm lata, atra, in disco 17 mm diametro; semina in loculis 2.

Large, erect, widely spreading tree 15 m tall and 30 cm in trunk diameter. Bark dark brown, slightly rough, with white latex. Common and with another, probably undescribed species of *Clusia* (*Little 6769*) a dominant tree species of the dry mountain forest in ravines at Huigra. Common name "lamai," according to Rose.

CHIMBORAZO: Huigra, altitude 1300 m, July 17, 1943, *Little 6768A* (Forest Service no.

98525; U. S. Nat. Herb. no. 1857089, TYPE; with fruits). *Little 6768* (Forest Service no. 95852; with staminate flowers). *Little 6768B* (Forest Service no. 98526; with staminate flowers). Huigra, Aug. 19, 1918, *J. N. Rose and George Rose 2223* (U. S. Nat. Herb. no. 1021907; with fruits and staminate flowers but also containing larger, detached, sectioned fruits of a different species).

Rose and Rose 2223 bears the note, " 'Not at Kew' N. L. B[ritton]. Sept. 1920." *Clusia plurivalvis* is not readily placed in the proper section in the latest summary of *Clusia* L. by Engler (Natürl. Pflanzenfam. ed. 2, **42**: 199–204. 1925). It seems to be in subgenus *Thysanoclusia* Vesque and related to section *Euclusia* Planch. & Triana, which differs in having the connectives elongate and pointed. In this species the numerous stamens are crowded and almost sessile in a convex disc, which bears a central resinous mass of staminodia. The number of carpels in the ovary in this species, 13–16, is very high. Of the species in which the number of carpels is known, only a few, such as *C. flava* Jacq. with 12–14 carpels, *C. cuneata* Benth. with 16, and the new species described below have more than 12 carpels.

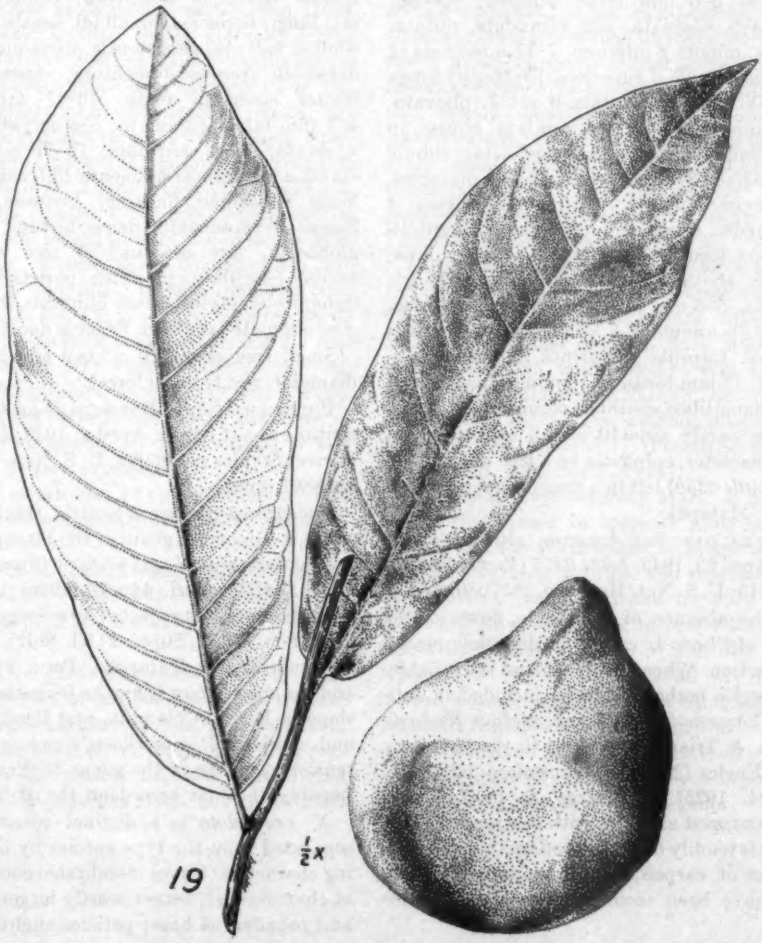

FIG. 19.—*Aspidosperma elatum*, ½×; fruit, ½×.

Clusia polystigma Little, sp. nov.
Fig. 15

Epiphyta magna, scandens, arborea, dioica, 10 m alta, trunco 10 cm diametro. Ramuli crassi, teretes. Folia subsessilia, obovata, 15–20 cm longa, 8–11 cm lata, basi angustata et subpetioliformes, apice obtusae, valde coriaceae, nervis lateralibus numerosis, parallelis, sub angulo ca. 50° adscendentibus. Flores masculi desunt. Inflorescentia feminea terminalis, racemosa, pauciflora, rhache 6 cm longa, bracteata, bracteis oppositis, late ovatis, 5–8 mm longis et 6–10 mm latis; pedicelli 3–6 mm longi; bracteae calycinae 2 late rotundatae, 3 mm longae et 5–6 mm latae, obtusae, crassae; sepala 4–6, biseriata, late rotundata, obtusa, coriacea, minora 2 inferiora, 7–11 mm longa et 9–12 mm lata, 2–4 superiora 15–16 mm longa et 12–18 mm lata; petala 6 vel 7, obovata, 32–34 mm longa et 22–24 mm lata, obtusa, in vivo albida, leviter incarnato-tincta; cupula staminodialis 3–4 mm longa, 12 mm diametro, apice leviter lobata; ovarium cylindricum, 4 mm longum, 6 mm diametro, sulcis longitudinalibus et loculis 16–19, loculis multiovulatis; stigmata 16–19, radiata, sessilia, anguste triangularia, 5–6 mm longa et 1.5 mm lata, atra, connata in annulo 4–5 mm longo et 8–9 mm diametro. Capsula succulenta immatura subglobosa, 18 mm longa et 16 mm diametro, sulcata, stigmatibus sessilibus coronata.

Large woody vine 10 m tall and 10 cm in trunk diameter, epiphytic on a tree of *Ficus* sp. nov. (*Little 6356*) left in a clearing, wet tropical forest. "Matapalo."

ESMERALDAS: San Lorenzo, altitude about 10 m, April 23, 1943, *Little 6355* (Forest Service no. 98245; U. S. Nat. Herb. no. 1857080, TYPE).

In the absence of staminate flowers, this species of *Clusia* L. cannot be definitely placed as to section. When more material is available, this species perhaps may be included in subgenus *Thysanoclusia* Vesque, section *Euclusia* Planch. & Triana, according to the summary by A. Engler (Natürl. Pflanzenfam. ed. 2, 21: 199–204. 1925). The large, 6- or 7-petaled flowers suggest affinities with this section. This species is readily distinguished by the very high number of carpels, 16–19, apparently more than have been recorded previously in this genus.

Neosprucea pedicellata Little, sp. nov.
Fig. 13

Arbor parva, 10 m alta, trunco 20 cm diametro, ramulis teretibus griseis, minute appresso-pubescentibus. Folia petiolata, petiolis appresso pubescentibus, 12–16 mm longis; laminae ellipticae, 10–20 cm longae, 6–10 cm latae, membranaceae, basi subrotundatae, apice attenuatae, margine remote obtuseque glanduloso-serratae, e basi distincte triplinerviae, glabrae nervis subtus minute paullo appresso-pubescentibus exceptis. Racemus lateralis laxus divergens, pauciflorus (2 vel 3), 5–6 cm longus; rachis et pedicelli subangulati, minute denseque tomentosi; pedicelli 25–30 mm longi; flores magni, albidi, sepala et petala similia, valvata, persistentia, utrinque breviter denseque appresso-tomentosa; sepala 4, basi leviter connata, ovata, 16–17 mm longa, 5–7 mm lata, acuminata, 5–8-nervata; petala 4, ovata, acuta, carinata, 15–17 mm longa; stamina numerosa; filamenta filiformia, 2 mm longa; antherae linearae, hirsutae, 5 mm longae; receptaculum dense hirtum; ovarium globosum, fere glabrum, 5 mm diametro, semi-5–7-loculare, placentis parietalibus prominentibus; stylus crasse filiformis, 9 mm longus; stigmate truncato. Fructus deest.

Small tree about 10 m. tall and 20 cm. in diameter, wet tropical forest.

PICHINCHA: Santo Domingo de los Colorados altitude about 560 m, April 2, 1943, *Little 6152* (Forest Service no. 96909; U. S. Nat. Herb. no. 1858861, TYPE).

Neosprucea Sleumer (Notizbl. Berl. **14**: 47. 1938), a monotypic genus of the Flacourtiaceae, was based upon *N. grandiflora* (Spruce) Sleumer (Notizbl. Berl. **44**: 47. 1938), originally described as *Banara grandiflora* Spruce (Journ. Linn. Soc. Bot. **5**. Suppl. **2**: 93. 1861). The type was collected at Tarapoto, Peru, by Spruce, and the species now is known from the Atlantic slope in Brazil, Colombia, and Peru. The second species, *N. pedicellata*, represents an extension of range of the genus to Ecuador and possibly the first record on the Pacific slope.

N. pedicellata is a distinct species readily separated from the type species by the following characters: leaves membranaceous (instead of chartaceous); leaves mostly larger, broader, and rounded at base; petioles slightly longer;

greatly elongated pedicels 25–30 mm long; and larger flowers. Though *N. grandiflora* was described by Sleumer with a spikelike raceme and pedicels only 2 mm. long, Mutis' specimens from Colombia have pedicels 10 to 20 mm. long.

Symplocos ecuadorensis Little, sp. nov.
Fig. 11

Subgenus *Eusymplocos* Brand, sect. *Symplocastrum* Brand, subsect. *Ciponimastrum* Brand. Arbor 15 m alta, trunco 20 cm diametro. Ramuli leviter hirsuti. Folia petiolata, petiolis hirsutis, 5–8 mm longis; laminae oblanceolatae, 5–10 cm longae, 2.5–4 cm latae, basi cuneatae, apice abrupte acuminatae, remote crenulatae, subcoriaceae, lucidae, supra glabrae, subtus parce hirsutulae, costa et venis primariis subtus prominentibus. Paniculae axillares, 1–2 cm. longae, rachibus hirsutis, bracteis ovatis, hirsutis, ciliatis, 1 mm longis; flores 7–8 mm longi, subsessiles; calyx 2–2.5 mm longus, hypanthio campanulato ca. 1 mm longo, glabro, lobis 5, late ovatis, ciliatis, 1–1.5 mm. longis; corolla alba, 6–7 mm longa, tubo ca. 3 mm longo, lobis 5, ellipticis, obtusis, apice ciliolatis, 3–4 mm longis et 2 mm latis; tubus stamineus tubo corollae adnatus, 1 mm longus; stamina 28–32 triserialia; filamenta complanata, 0.2–2.5 mm longa; ovarium fere omnino inferum, 1.5 cm. altum, apice pilosum, 3- vel 4-lobulatum. Fructus baccatus, cylindricus, lobis calycinis et basi styli coronatus, 10 mm. longus, 5 mm diametro, 3- vel 4-locularis.

Tree 15 m tall and 20 cm in diameter. Two trees were seen in a pasture, cleared wet tropical forest.

ESMERALDAS: San Lorenzo, altitude about 10 m, April 22, 1943, *Little 6349* (Forest Service no. 98370; U. S. Nat. Herb. no. 1858685, TYPE).

Though the genus *Symplocos* Jacq. is widely distributed with about 300 species in tropical and subtropical America, Asia, and Australia, most species have restricted ranges. This material from the poorly explored Ecuadorian province of Esmeraldas could not be assigned to any of the species from northwestern South America.

Aspidosperma elatum Little, sp. nov.
Fig. 19

Arbor magna, 35 m alta; trunco 1 m diametro, profunde sulcato et angulato. Cortex fere laevis, leviter fissus, albido-griseus. Ramuli subteretes, puberuli. Folia alterna, non congesta, internodiis 4–7 cm longis, petiolata, petiolis fusco-puberulis, 1 cm longis; laminae magnae, oblongo-oblanceolatae, chartaceae, 22–26 cm longae, 7–9 cm latae, basi subrotundatae, apice acutae vel obtusae, fere glabrae, supra virides, subtus glaucescentes, costa leviter puberula, supra canaliculata, subtus elevata, nervis lateralibus utrinque 13–16, fere rectis, prope marginem leviter arcuatis, subtus elevatis, secundariis inconspicuis. Inflorescentiae desunt. Mericarpia magna, compressa, suborbicularia, 10–12 cm longa, 9–10 cm lata, 2 cm crassa, externe dense fusco-tomentosa, pericarpio lignoso, 5–8 mm crasso; semina plano-compressa, suborbicularia, 9 cm longa, 7 cm lata, alis latis, papyraceis.

Large tree of forest canopy, to 35 m tall and 1 m in trunk diameter. Easily recognized in the field by the odd, fluted trunk with deep, branching, vertical grooves. Bark smoothish, slightly cracked, whitish-gray. Wet tropical forest at Pichilingue. "Naranjo de monte."

LOS RÍOS: Pichilingue, altitude about 45 m, May 25, 1943. *Little 6517* (Forest Service no. 98223; U. S. Nat. Herb., TYPE).

The genus *Aspidosperma* Mart. & Zucc. is widely distributed in tropical America from Mexico and the West Indies to Brazil and Argentina, centering in Brazil and represented in northwestern South America by only a few species. Four species were recorded from Colombia by Standley (Trop. Woods 36: 13–20. 1933). The herbarium material of *Aspidosperma elatum*, which consists of foliage and detached fruits, seems sufficiently distinctive, as the leaves and fruits are larger than in most species. Apparently this is the second species of *Aspidosperma* recorded from Ecuador.

HERPETOLOGY.—*A collection of salamanders from Mount Rogers, Virginia.*[1] RICHARD L. HOFFMAN and HUBERT I. KLEINPETER. (Communicated by HERBERT FRIEDMANN.)

Although White Top Mountain, Va., is well known to students of salamander distribution, and is subjected to periodic depredation by different collectors; its adjacent neighbor to the northeast, Mount Rogers, has apparently escaped the attention of most herpetologists. The absence of any particular road to the summit of Mount Rogers may be partly responsible for this neglect.

When, in the summer of 1947, we had the opportunity to be in southwestern Virginia, we avoided White Top believing that we could make no particular contribution by further depleting its already well-known herpetological fauna. Instead a period of three days was spent on Mount Rogers. Our station was located on the eastern slope, in Grayson County, at an elevation of about 4,500 feet, from which one all-day journey was made to the top, as well as many short trips in the general region about the camp.

The lower slopes of the mountain are thickly forested with a mesophytic flora which might be characterized as a maple-hemlock-dogwood association, with comparatively little undergrowth of herbaceous plants. Although fir and spruce trees are widely scattered, the extensive stands are restricted to the uppermost 500 or 600 feet of the knob. Here red spruce, *Picea rubra* (DuRoi) Dietr., and southern fir, *Abies fraseri* (Pursh) Poir., seem to comprise the entire evergreen forest, the latter being by far the more abundant. The ground is completely covered by mosses and thick carpets of the wood sorrel, *Oxalis acetosella* L. A striking feature of the evergreen stands is the large number of logs and stumps, all in approximately the same stage of decomposition. The more level parts of the top are covered by heavy growths of various ferns.

From a physiographic standpoint, the Balsam Mountains (of which White Top and Mount Rogers form the bulk) are characteristic of the Southern Section of the Blue Ridge Province. White Top has previously been designated part of the Iron Mountains, but the recent Mount Rogers Quadrangle (*q.v.*) of the U. S. Geological Survey ranks the Iron and Balsam Mountains as separate units.

Although a rather large number of salamanders was encountered, they represented but a few species. The contrast between the salamander fauna of White Top and Mount Rogers is interesting in that the following species reported from the former were not found by us on Mount Rogers: *Triturus v. viridescens*, *Desmognathus monticola*, *Plethodon c. cinereus*, *P. g. glutinosus*, *P. yonahlossee*, and *Pseudotriton ruber nitidus*. It is difficult to account for the apparent absence of several of these species, whereas at least one other form which is scarce on White Top (*Plethodon welleri*), is extremely common on Rogers. In the case of *P. yonahlossee*, it is not inconceivable that we collected above its maximum elevation preferences. The lower slopes seemed very favorable for *P. glutinosus*, but the only *Plethodon* found there was *metcalfi*, which was present in considerable numbers.

In addition to the salamanders which (with the exception of a small series of a strange *Desmognathus* reserved by the junior author for further examination) have been donated to the United States National Museum, the following amphibians and reptiles were found on Mount Rogers: *Bufo terrestris americanus*, *Lampropeltis t. triangulum*, and *Thamnophis s. sirtalis*. One specimen of the last named was seen sunning itself on a rock at approximately 5,500 feet; the others were all seen near our station at 4,500 feet.

We take pleasure in indicating our gratitude to Drs. Horton H. Hobbs, Jr., and Arnold B. Grobman for help in preparation of this paper, and to Dr. Doris M. Cochran for courtesies attendant upon our visits to the National Museum.

[1] Received October 20, 1947.

LIST OF SPECIES

Desmognathus fuscus fuscus (Rafinesque)

Six specimens, which were not presented to the Museum, were collected in a large seepage area located in a cleared saddle on the northeast side of Mount Rogers. This species was not represented farther down in the stream emanating from the spring.

Desmognathus ochrophaeus carolinensis Dunn

Sixteen individuals, U.S.N.M. nos. 124455–70, were collected at elevations from 4,500 to 5,700 feet. The species seemed to be equally common in evergreen and deciduous forests.

Desmognathus quadramaculatus quadramaculatus (Holbrook)

Nine specimens, mostly large adults, U.S.N.M. nos. 124471–79. On July 2 we collected in a small but cold and swift stream on the eastern slope of the mountain at an elevation of about 4,300 feet. This species was especially common; most of the specimens found being under submerged rocks in rapids. The largest specimen included in our series measures 78 mm from snout to vent, a size not approached by specimens from farther north in Virginia.

Desmognathus wrighti King

Two adults, U.S.N.M. nos. 124480 and 124634, were collected at an elevation of approximately 5,600 feet. They were found in rotting logs in company with *Plethodon welleri*. Mount Rogers is the northernmost locality at which this diminutive salamander has been found.

Plethodon metcalfi Brimley

Eight specimens, U.S.N.M. nos. 124412–18, 124631. This species shares with *D. o. carolinensis* the distinction of being one of the two most abundant salamanders on Mount Rogers, and the size of our series is in no way indicative of the abundance of the animal. In the evergreen forests, *metcalfi* occurred all the way to the very summit of the mountain, although less common on the top; in and under logs but not in stumps.

Plethodon welleri Walker

Eleven specimens, U.S.N.M. nos. 124442–49, 124632–33. The size of the series serves to indicate the relative abundance of this heretofore supposedly rare species. Far more were collected than were retained. It was not until we were several hundred yards within the evergreen forest that we found the first *welleri*, but thereafter almost every log or stump examined contained one and occasionally two specimens. Most frequently, *welleri* was found in decaying, moss-covered stumps, usually in the upper portion. Individuals found in logs were usually lying with the body in a "U"—the end of the tail near the head. Many of them remained still and were easily caught.

One log, nearly at the top, was found to contain two females with their eggs. This log, seemingly identical with many others investigated, was supported about 18 inches above the ground. The females were discovered in small crevices in the damp wood, about 6 inches apart, an inch under the surface of a layer of moss. Both were curled around the eggs, and showed some reluctance to leave them. In fact, one, on being dislodged, moved back after a short time. The larger clutch contained nine eggs, which were slightly pear-shaped and averaged 4.2 (3.6–5.0) mm in the largest diameter. We could detect no particular pedicles, and the eggs clung together by the adhesive nature of the outer envelopes. The smaller clutch included seven eggs, which are arranged in a ring of five with one above and below at the center. In color, the eggs were a light creamy yellow, and no trace of embryos could be discerned within. The mothers differed in size in accordance with the number of eggs, the larger measuring 47 mm snout to vent (87.5 mm total length) and the smaller 43.5 mm snout to vent (79.1 mm total length). It is interesting that of the many *welleri* seen, the only two with egg masses were in the same log. We wonder if it was due to coincidence or to a tendency of the females to congregate at a sort of *Wochenstube* where conditions for hatching and growth (not apparent to humans) are optimum.

Mount Rogers is the fourth locality reported for this form, and it is probably more abundant there than at any other place. Only a dozen or so specimens have been taken altogether on White Top, thus its abundance on Mount Rogers is the more interesting, particularly in view of the fact that we covered such a small area.

Gyrinophilus sp.

One larval specimen, U.S.N.M. no. 124487. This individual was found in the stream noted above under *D. q. quadramaculatus* and was but one of several seen in this and the rivulet where *D. f. fuscus* was secured. We expended several hours in a particular attempt to obtain adults, which seem to have escaped the efforts of White Top collectors as well. One would expect the adults, from geographic probability, to be *Gyrinophilus danielsi*. An attempt which was made to raise the larva to transformation was unsuccessful. Collectors who visit the Balsams in the future should make special efforts to obtain adult specimens.

Eurycea bislineata wilderae Dunn

Two adults, U.S.N.M. nos. 124484, 124629, were taken, of which one was found under a rock in a marshy area at about 4,900 feet on the east side of the top. The second example was discovered in a thick leaf pile along the side of the creek mentioned above under *D. q. quadramaculatus*.

ORNITHOLOGY.—*The races of the silver-breasted broadbill*, Serilophus lunatus (*Gould*).[1] H. G. DEIGNAN, U. S. National Museum.

Through the kindness of the authorities of the Chicago Natural History Museum (C.N.H.M.), the Academy of Natural Sciences of Philadelphia (A.N.S.P.), and the American Museum of Natural History (A.M.N.H.), I have been enabled to add to the series of the silver-breasted broadbill in the United States National Museum (U.S.N.M.) to make a total of 93 specimens.

From the taxonomic point of view, this has proved to be a highly unsatisfactory species. While the races may be immediately broken into three main groups, in accordance with the color of the lores (black, rusty, or ashy), further subdivision hinges upon such subtle factors as the extent and intensity of tones of gray and brown and is complicated by a certain degree of individual variation in almost any given character. Thus, while subspeciation appears in all the zoogeographic areas where such might be expected, yet it is a matter of the greatest difficulty to set forth intelligible diagnoses, even when these apply, not to individuals, but to series. In the diagnoses given below, only characters that possess subspecific importance will be noted; it may be said at once that no consequential variation has been found in measurements or in the complicated patterns of wing and tail.

With the understanding that *Serilophus rubropygius* (Hodgson) represents a closely allied but independent species, I find the following populations of *S. lunatus* apparently worthy of nomenclatorial recognition:

1. **Serilophus lunatus polionotus** Rothschild

Serilophus lunatus polionotus Rothschild, Bull. Brit. Orn. Club **14**: 7. Oct. 30, 1903 (Mount Wuchi, Hainan).

Diagnosis.—The lores black; the sides of the head and the ear coverts pale ashy ferruginous; the forehead pale ashy gray, this color changing insensibly to the pale ashy ferruginous of the crown and nape; the scapulars and upper back ashy gray; the lower back rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Hainan.

Specimens examined.—HAINAN: Mount Wuchi (10 males, 3 females).

2. **Serilophus lunatus elisabethae** La Touche

Serilophus lunatus elisabethæ La Touche, Bull. Brit. Orn. Club **42**: 14. Oct. 29, 1921 (Hokow, elev. 300 feet, southeastern Yunnan Province, China).

Diagnosis.—The lores blackish; the sides of the head and the ear coverts pale ferruginous; the forehead pale ashy, this color changing insensibly to the ferruginous of the crown and nape; the scapulars and upper back deep ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

[1] Published by permission of the Secretary of the Smithsonian Institution. Received July 18, 1947.

Range.—The valley of the Red River from the Chinese frontier to its mouths and thence southward into northern Annam.

Specimens examined.—YUNNAN: Southeast: Hokow (1 female); ANNAM: Thanhoa Province: Lunglunh (2 males); Vinh Province: Phuqui (1 female).

3. **Serilophus lunatus impavidus,** n. subsp.

Type.—C.N.H.M. no. 90275, adult male, collected at Thateng (lat. 15°31′ N., long. 106°22′ E.), Saravane Province, Bas-Laos, on December 6, 1931, by Jean Delacour (original number 743).

Diagnosis.—The lores black or blackish; the sides of the head and the ear coverts pale ferruginous; the forehead pale ashy, this color changing insensibly to the light ferruginous of the crown and nape; the scapulars and upper back brownish ashy; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Bas-Laos (Boloven region).

Specimens examined.—BAS-LAOS: Saravane Province: "Boloven Plateau" (1 male), Thateng (4 males, 4 females), Ban Kok (1 male), Pakse (1 male, 1 female).

Remarks.—This race is very near to *S. l. elisabethae*, with which it has been heretofore confused, but is easily distinguishable, especially in series, by the predominantly ashy hue of the scapulars and upper back. Certain examples of true *elisabethae* seem to approach it in this respect but prove to be less well-made skins, in which the grayish *bases* of the feathers are exposed to view. In series also the reds of crown, nape, lower back, rump, upper tail coverts, and innermost secondaries average slightly paler in *impavidus* than in *elisabethae*.

4. **Serilophus lunatus aphobus,** n. subsp.

Type.—U.S.N.M. no. 330375, adult male, collected on Khao Laem (a mountain of the San Kamphaeng Range at lat. 14°25′ N., long. 101°30′ E.), at the southwestern corner of the eastern Siamese Plateau, on December 28, 1930, by Hugh M. Smith (original number 4432).

Diagnosis.—The lores blackish rusty; the sides of the head and the ear coverts ferruginous; the forehead pale ashy, this color changing insensibly to the light ferruginous of the crown and nape; the scapulars and upper back ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Eastern Siam.

Specimens examined.—SIAM: East: Ban Lam Thong Lang (1 male), Khao Laem (1 male, 1 female).

Remarks.—The present form is similar to both *S. l. elisabethae* and *S. l. impavidus*, but separable from either by having the lores blackish rusty instead of black, and the sides of the head and ear coverts a rather more vivid ferruginous. The color of the scapulars and upper back is intermediate between those of *elisabethae* and *impavidus*.

A male from Khao Soi Dao and another from Ban Bang Phra, localities in extreme southeastern Siam, are near *aphobus* but have the reds slightly deeper in tone. For the present they must be left unnamed.

5. **Serilophus lunatus atrestus,** n. subsp.

Type.—A.M.N.H. no. 143346, adult male, collected at Mengting (lat. 23°33′ N., long. 99°05′ E.), western Yunnan Province, China, on February 19, 1917, by Roy C. Andrews and Edmund Heller (original number 492).

Diagnosis.—The lores blackish rusty; the sides of the head and the ear coverts bright ferruginous; the forehead pale ashy, this color changing insensibly to the bright ferruginous of the crown and nape; the scapulars and upper back ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Northeastern Burma; Northern and Southern Shan States; western Yunnan; Haut-Laos; Tongking (west of the Black River-Red River divide); northern Siam (eastern provinces.)

Specimens examined.—YUNNAN: West: Mengting (1 male); SOUTHERN SHAN STATES: Kengtung State: Mong Len (1 male); SIAM: Northeast: Muang Lom Sak (1 male); HAUT-LAOS: 5° Territoire Militaire: Muong Yo (2 males, 2 females); TONGKING: Laichau Province: Muong Mo (1 male).

Remarks.—This race is distinguishable in series from *S. l. aphobus* by the more vivid

tones of the reds of the sides of the head, ear coverts, and upper parts.

From *S. l. elisabethae* it may be separated by having the lores blackish rusty instead of black, and by having the reds of the sides of the head, ear coverts, and upper parts distinctly lighter and brighter.

6. **Serilophus lunatus lunatus** (Gould)

Eurylaimus lunatus Gould, Proc. Zool. Soc. London 1 (12): 133. Apr. 16, 1834 ("apud Rangoon"; type locality here restricted to the hills of the Pegu District, Pegu Division, Burma).
Eurylaimus lunatus Gould, Trans. Zool. Soc. London 1 (2): 176, pl. 25. Apr. 23–25, 1834 ("apud Rangoon, Peninsulæ Indiæ ulterioris").

Diagnosis.—The lores rusty or blackish rusty; the sides of the head and the ear coverts ferruginous; the forehead pale ashy, this color changing insensibly to the light ferruginous of the crown and nape; the scapulars and upper back ashy brown; the lower back rufescent, this color changing to chestnut-rufous on the rump and upper tail coverts; the innermost secondaries rufous-buff.

Range.—Pegu Yomas; Karenni; Tenasserim (south to the Amherst District); northwestern Siam (including Chiang Rai Province).

Specimens examined.—Siam: Northwest: Chiang Saen Kao (1 male, 2 females), Wiang Khae (1 female), Ban Muang Sum (1 male), Doi Pha Hom Pok (1 male, 1 female), Doi Hua Mot (1 male, 2 females), Doi Chiang Dao (1 male, 2 females), Doi Suthep (1 male, 2 females), Doi Khun Tan (1 male, 2 females); Tenasserim: Salween District: Papun (1 male).

Remarks.—The population I have taken to represent *S. l. lunatus* is immediately separable from all except the next following by the pale coloration of its innermost secondaries.

It must be said, however, that no topotypical material has been available to me, and the assumption that the bird of Pegu is the same as that of northwestern Siam rests only upon zoogeographical probability. The colored portrait of "*lunatus*" in Gould's *Birds of Asia* is, as observed by Hume (Stray Feathers 3: 53. 1875), altogether too brightly colored; that given in the Trans. Zool. Soc. London could as easily picture the race described below from southwestern Siam.

7. **Serilophus lunatus intrepidus**, n. subsp.

Type.—A.M.N.H. no. 203342, adult female, collected 28 miles southeast of Ban Um Phang (a village at lat. 15°47′ N., long. 98°50′ E.), southwestern Siam, on February 2, 1924, by Arthur S. Vernay (original number 611).

Diagnosis.—The lores rusty or blackish rusty; the sides of the head and the ear coverts ferruginous; the forehead pale ashy, this color changing insensibly to the light ferruginous of the crown and nape; the scapulars and upper back ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries rufous-buff.

Range.—Southwestern Siam and the adjacent parts of Tenasserim (Amherst and Tavoy Districts).

Specimens examined.—Tenasserim: Amherst District: "Thaungyin valley" (1 male), "Thoungyin" (1 male), Moulmein (1 male), headwaters of the Mepale Chaung (1 female), Mitan (1 male); Siam: Southwest: 17 miles east of Lakya, Tenasserim (1 female), 28 miles southeast of Ban Um Phang (1 male, 1 female), 20 miles west of Muang Kamphaeng Phet (1 female).

Remarks.—*S. l. intrepidus* is distinguished from all races except *lunatus* by the light-colored innermost secondaries. From *lunatus* itself it is separable only by the richer coloration of the posterior upper parts, in this showing normal intergradation between the more northern form and *S. l. stolidus*.

It is probable that the differentiating character of the race would appear more strongly in specimens from more southerly localities; in default of such material, I have selected as type locality the most southern provenience represented in my series.

8. **Serilophus lunatus stolidus** Robinson and Boden Kloss

Serilophus lunatus stolidus Robinson and Boden Kloss, Bull. Brit. Orn. Club 40: 16. Dec. 8, 1919 (Khao Nong, a mountain in peninsular Siam at lat. 8°55′ N., long. 99°38′ E.).

Diagnosis.—The lores ashy rusty; the sides of the head and the ear coverts ashy ferruginous; the forehead and forecrown pale ashy, this color changing insensibly to the pale ashy ferruginous of the hindcrown and nape; the

scapulars and upper back ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Peninsular Siam (south of lat. 11°40′ N.); Tenasserim (Mergui District).

Specimens examined.—SIAM: Peninsula: Khao Luang, at lat. 11°40′ N., long. 99°35′ E. (1 female), Khao Luang, at lat. 8°30′ N., long. 99°45′ E. (3 males).

Remarks.—Compared with "*lunatus*" from the Isthmus of Kra, Robinson and Boden Kloss found that *stolidus* had "deeper-coloured inner secondaries and tertiaries" and "slightly more drab, less fulvous ear coverts." One would not ordinarily expect isthmian examples (lat. 10° N.) to differ in any important way from those of Khao Nong (lat. 8°55′ N.), and the fact that the single specimen from lat. 11°40′ N. is indistinguishable from those of lat. 8°30′ N. seems to show that only one race occurs in the Siamese portion of the Peninsula.

9. Serilophus lunatus rothschildi Hartert and Butler

Serilophus rothschildi Hartert and Butler, Bull. Brit. Orn. Club **7**: 50. May 25, 1898 (Gunong Ijau, elev. 3,000 feet, Perak State, Malaya).

Diagnosis.—The lores pale ashy; the sides of the head and the ear coverts ashy or brownish ashy; the forehead and forecrown pale ashy, this color changing insensibly to the brownish ashy or ashy brown of the hindcrown and nape; the scapulars and upper back deep ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Malaya (northern Perak to southern Selangor).

Specimens examined.—MALAYA: Perak State: Gunong Ijau (2 females); Selangor State: Ginting Bidei (2 females).

10. Serilophus lunatus moderatus Chasen

Serilophus lunatus moderatus Chasen, Treubia **17** (2): 137. July 1939 (Palok, near Mount Leuser, elev. *ca.* 1,000 meters, Achin, northern Sumatra).

Diagnosis.—The lores blackish ashy; the sides of the head and the ear coverts ashy or brownish ashy; the forehead and forecrown pale ashy, this color changing insensibly to the brownish ashy or ashy brown of the hindcrown and nape; the scapulars and upper back deep ashy brown; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Northern Sumatra (Achin).

Specimens examined.—SUMATRA: North: Bandar Bahru (1 male), Blangnanga (2 males, 2 females), Blangbeke (1 male, 1 female), Kungke (1 female).

Remarks.—This form seems to be separable from *rothschildi* only by its darker lores.

11. Serilophus lunatus intensus Robinson and Boden Kloss

Serilophus lunatus intensus Robinson and Boden Kloss, Journ. Straits Branch Roy. Asiat. Soc. **73**: 276. July 1916 (Siolak Dras, Korinchi Valley at elev. 3,100 feet, southwestern Sumatra).

Diagnosis.—The lores blackish ashy; the sides of the head and the ear coverts brownish ashy; the forehead and forecrown pale ashy, this color changing insensibly to the brownish ashy or ashy brown of the hindcrown and nape; the scapulars and upper back deep ashy brown, lightly suffused with rufous; the lower back chestnut-rufous, this color changing to rufous-chestnut on the rump and upper tail coverts; the innermost secondaries chestnut-rufous.

Range.—Sumatra (excepting Achin).

Specimens examined.—SUMATRA: Southwest: Siolak Dras (2 males, 1 female).

Remarks.—Meyer de Schauensee and Ripley (Proc. Acad. Nat. Sci. Philadelphia **91**: 336. 1940) have combined *moderatus* with *rothschildi* but have kept *intensus* as a "thin" race, barely separable from their *rothschildi-moderatus*. All Sumatran birds seen by me, however, are easily distinguishable from true *rothschildi* by the color of the lores. To my eyes, the real problem is to divide *moderatus* from *intensus*, and this seems to be just possible in series by the tone of the brown of the scapulars and upper back.

PROCEEDINGS OF THE ACADEMY

Meeting of Executive Committee

The Executive Committee met in the Cosmos Club at 8:10 P.M. on February 2, 1948, to consider the budget submitted by the Treasurer. The President, F. D. Rossini, presided; others present were: H. S. Rappleye, Walter Ramberg, W. L. Schmitt, and C. L. Gazin. After careful consideration of the separate items, the Committee unanimously approved the following budget for 1948:

Item		*Amount*
Operating Expenses:		
Meetings Committee	$ 500	
Secretary	400	
Treasurer	250	
S. M. & C. of Pubs.	50	$1,200
Journal:		
Printing, mailing, illustrations, & reprints	$4,776	
Editorial Assistant	300	
Miscellaneous	50	5,126
Total expenditures		$6,326
Estimated receipts		6,144
Deficit		$ 182

In view of the evident deficit the Committee turned its attention to ways and means of increasing the Academy income so that running expenses in the future might be met from yearly income without depleting the invested assets. Discussion was centered about two means: increasing the number of paying members and initiating a drive for Journal subscriptions.

About 18 vacancies exist in the Academy membership, and an informal discussion the Committee showed agreement in favor of raising the limit of membership to permit a greater income from this source.

With regard to the possibility of obtaining additional funds from new subscriptions, the Secretary was instructed to inform the Custodian and Subscription Manager of Publications that the Executive Committee is desirous of having the Subscription Manager attempt to secure these subscriptions through distribution of approximately 100 copies of an appropriate issue of the Journal, each with a reprint of the index of the Journal for 1947 and a covering letter to various university and scientific institution libraries in this country and abroad not now subscribing to the Journal.

The meeting was adjourned at 9:55 P.M.

C. L. Gazin, *Secretary.*

Obituary

Robert Hamilton Lombard was born in Ashburnham, Mass., on December 3, 1887, and died on October 11, 1947. He was graduated from Cushing Academy in Ashburnham in 1906, and from Massachusetts Institute of Technology in 1910 with the S.B. degree. While at M.I.T. he was research assistant in physical chemistry. He published papers with Prof. M. DeKay Thompson and Prof. A. A. Noyes, under whom he worked. He obtained his Ph.D. degree at Columbia University in 1915 in chemistry and was an instructor there. He published two papers with Prof. Alexander Smith, one dealing with phosphorus pentachloride and the other with ammonium halides.

From 1915 to 1927 Dr. Lombard was employed as a chemist in the Geophysical Laboratory of the Carnegie Institution of Washington, where he conducted research on the system copper-iron-sulphur. He published three papers on this work, with E. T. Allen and H. E. Merwin as co-authors.

For the last 20 years Lombard was a research chemist in the Norton Company, Research Laboratories, at Worcester, Mass. He made important contributions to the abrasive industry, and a number of patents, both domestic and foreign, have been granted covering his developments. Most of his researches were connected with the vitrified bonding of grinding wheels and other abrasive products. The most important new product resulting from his work is a grinding wheel having diamonds as the abrasive grains and a new-type vitrified bond. This product is superior to resinoid bonded and metal bonded diamond wheels in that the diamonds are held more firmly and efficiently while, at the same time, a freer cutting action is obtained.

Dr. Lombard was a member of the honorary scientific societies Sigma Xi and Phi Lambda Upsilon. He was a member of the American Chemical Society, the Washington Academy of Sciences, the American Fern Society, and the Worcester Chemists' Club and was a fellow of the American Association for the Advancement of Science. His hobbies included botany and photography, and he had a collection of fine cameras. He was a member of the First Baptist Church of Worcester.

He is survived by his wife, Hazel Soule Lombard, and a 12-year old daughter, Anne.

L. H. Milligan.